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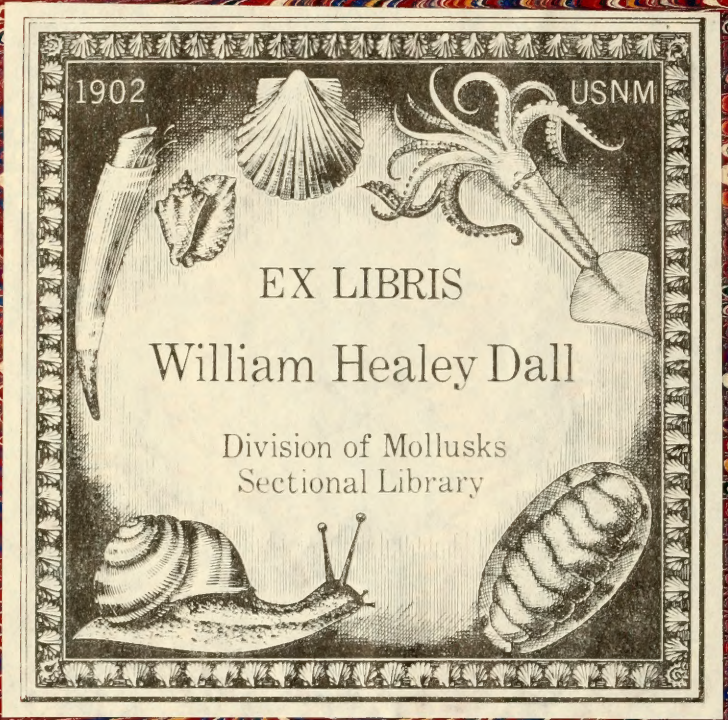
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SECOND CATALOGUE OF MOLLUSCA,

RECENTLY ADDED TO THE FAUNA OF THE NEW ENGLAND COAST AND THE ADJACENT PARTS OF THE ATLANTIC, CONSISTING MOSTLY OF DEEP SEA SPECIES, WITH NOTES ON OTHERS PREVIOUSLY RECORDED.

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WITH PLATES XXVIII, XXIX, XXX, XXXI, XXXII.

BY A. E. VERRILL.

[FROM THE TRANSACTIONS OF THE CONNECTICUT ACADEMY, VOL. VI, PART 1.]

New Haven.—April to July, 1884.

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[From the Transactions of the Connecticut Academy, Vol. VII, April, 1884.]

Second Catalogue of Mollusca recently added to the Fauna of the New England Coast and the adjacent parts of the Atlantic, consisting mostly of Deep-Sea Species, with Notes on others previously recorded.

By A. E. Verrill.

[Published by permission of the U. S. Fish Commission.]

The following paper was originally intended to form merely a brief supplement to the Catalogue published by me, in 1882, in Vol. V. of these transactions, to include such corrections and additions as had been noticed up to date. But the discovery of a very large number of interesting additional species, many of them new, during the deep-sea dredging cruises of the Fish Commission Steamer, Albatross, in 1883, made it desirable to extend the paper so as to include many of the more important of these discoveries. This has caused delay in the printing of the paper and much increased its length, and, as I hope, its value. Many of the additions made in 1883 are from much deeper water than we had previously explored (1,000 to 2,900 fathoms), and consequently from a greater distance at sea; so that these cannot properly be regarded as pertaining particularly to the "New England fauna." They belong rather to the general deep-sea fauna of the western Atlantic. Others are from the deep waters of the continental slope, beneath the Gulf Stream, in 100 to 600 fathoms. As these deep-sea forms are likely to extend all along our coast, at similar depths, and even to foreign waters, I have not thought it desirable to exclude from this paper any deep water species because of its having been taken even as far south as off Cape Hatteras, which was nearly the southern limit of the dredgings of the Albatross in 1883. But I have excluded the strictly southern shallow water forms, dredged at moderate depths off the coasts of North Carolina and Virginia, though many of them are new additions to the fauna of our coast.

There are, doubtless, to be added to our list many species of small and difficult shells, belonging to certain groups that have not yet been fully examined, or of which we have taken only imperfect examples. These will chiefly belong to the *Bullidæ*, *Turbonilla*, *Odostomia*, *Cryptodon*, and *Yoldia*.

I am greatly indebted to the skill of Mr. J. H. Emerton for the unusually accurate illustrations, and to the U. S. Fish Commission for the privilege of using them in this place.

The original assorting and preservation of the deep-sea specimens taken by the Albatross was largely done by Mr. Sanderson Smith, who went on all the cruises of the Albatross, except a few of the earliest. He was assisted by several other members of the party, and especially by Ensign W. E. Safford, U. S. N.

My work has also been particularly facilitated by the care and skill with which the final assorting, cataloguing, and labeling of the large collections have been done by my assistant, Miss K. J. Bush, who has, also, made many identifications of the described species, and given aid in other ways.

When the various lots were first examined and assorted, at Wood's Holl, last summer, during the dredging season, many of the new species, especially the largest and most striking, were recognized as forms not before observed on our coast, both by Mr. Sanderson Smith, who had special charge of the shells, and myself. For such species, in this article, "Verrill and Smith" are usually given as authorities, but the writer is alone responsible for the descriptions of all the species, as in his previous papers on the same subject.

Some of the previously known species, first discovered on our coast last summer, were first identified by Mr. Smith, and others by Miss Bush, but the writer has independently examined and confirmed all such species, given in this paper.

CEPHALOPODA.

Leptoteuthis Verrill, gen. nov.

Body elongated and slender, pointed behind, with a well developed terminal fin. Head relatively large, much elongated. Eyes not exsert, with simple thin lids. Mantle free dorsally, with a special dorsal and two lateral connective cartilages; the lateral ones simple, tubercle-like, corresponding to a roundish cartilage-pit on each side of the siphon. Arms slender, the ventral ones much the largest and longest. Suckers depressed, in two rows. Tentacular arms rather long, slender, with a somewhat expanded terminal club, bearing simple suckers, and with a row of small sessile suckers and rounded warts along the whole length of the inner surface of the slender portion. Gills and viscera anteriorly situated. Stomach short, with a saccular appendage.

This genus has, hitherto, not been distinguished from *Leachia* and *Loligopsis*. From the typical forms of these groups it differs greatly in anatomical characters, as well as in external appearance. From

Taonius and *Desmoteuthis* it differs still more widely, and evidently has no near relationship with them. It shows more affinity with *Cheiroteuthis*, in the connective cartilages and many other respects, and like that genus has large ventral arms, with a special row of color spots on them; but there is nothing of the peculiar structure of the tentacular suckers seen in the latter. Its nearest allies appear to be *Calliteuthis* V. and *Brachioteuthis* V., from both of which it is clearly distinct generically. It may, therefore, be referred to the family *Cheiroteuthidæ*, along with the two last-named genera.

Leptoteuthis diaphana Verrill, sp. nov.

PLATE XXXII, FIGURE 1.

A small, elongated, very slender, translucent species, with the head very large and long, as compared to the body, its length being more than half that of the body and tail taken together, and more than three-fourths that of the body to the caudal fin. Sessile arms slender, the ventral arms much larger and longer than the others, about equal in length to the head and body to the base of the tail. Tentacular arms long and slender. Caudal fin ovate, acutely pointed posteriorly.

Head elongated, cylindrical, smooth, and nearly transparent, except in the region of the eyes. The eyes are of moderate size, not very prominent, with a broad, thin lower eyelid, but without any distinct lachrymal sinus. Body, in front of the fin, slender anteriorly, about equal to the head in diameter, somewhat tapering backward to the base of the caudal fin, and then abruptly narrowing to a very slender caudal portion, running along the under surface of the fin like a mid-rib and terminating in a very slender, acute tip. Anterior edge of the mantle thin, very evenly truncated ventrally and laterally, but extending on the dorsal side into a broad, angular, obtusely pointed lobe. Caudal fin relatively large, elongated, ovate, decidedly broadest in the middle, narrowing distinctly anteriorly, with the anterior lobes small, rounded, and projecting only slightly forward beyond the insertion; posteriorly the fin narrows rapidly to a long, slender, acuminate tip. Siphon well developed, with the terminal portion elongated and free for some distance, strongly recurved in our specimen. Connective cartilages on the lateral base of the siphon small, elliptical, somewhat ear-shaped, with a continuous, raised rim, and with two small interior lobes, one of which is ventral and the other posterior, leaving between them a small, deep sinus, directed downward and backward. The corresponding cartilages on the inner surface of the mantle are small prominent, somewhat triquetral tubercles,

with the corners rounded and the obtuse tip a little prominent and directed posteriorly.

The arms increase in size and length from the dorsal to the ventral pairs. The dorsal arms are very slender and short, in length not half as long as the head; the second and third pairs are similar in form, but increase regularly in size and length, the third pair not being equal to the length of the head; the ventral arms are, on the contrary, very much larger and longer than the third pair, their length being nearly three times as great; the tentacular arms are very slender and considerably exceed the ventral arms in length when extended; the club is distinctly larger than the rest of the arm, a little flattened and expanded in a narrow lanceolate form, and covered by regular, minute suckers, arranged in about four rows along the middle portion. The slender portion of the arms bears a row of small sessile suckers and tubercles along nearly its whole length; these suckers are usually elliptical in form where the arm is extended, but circular when contracted; they are rather larger than the suckers of the club, but are only a little elevated, and are so numerous that the intervals between them are often not greater than their own diameter, but when the arms are fully extended these intervals are increased. On the ventral arms the suckers are small, oblique cups, constricted at the aperture and attached by very slender pedicels; they are arranged rather distantly in two alternating rows, which occupy only a narrow median band on the inner face of the arms; just exterior to the outer suckers, and alternating with them, there is a row of small, rounded, slightly raised, reddish brown warts, in diameter equal to or somewhat exceeding the suckers. On the other arms the suckers are relatively more numerous, and more closely arranged in two regular rows; on these arms they are about the same in size as on the ventral ones, but are flatter, less obliquely attached, and have the aperture less constricted and not so one-sided. On the inner surface of these arms there are two rows of brown spots, alternating with the suckers. Color of the body and head, in alcohol, pale, translucent bluish white, spotted along the middle of the dorsal surface with rather large chromatophores, which are not very numerous, and with fewer scattered ones on the sides and ventral surface. Caudal fin yellowish white, opaque (owing to the effect of the alcohol), with a median band of chromatophores along the dorsal surface and with very few beneath. On the dorsal side of the head, between the eyes, the chromatophores are more numerous than elsewhere; a row of similar chromatophores extends along the outer surface of each arm. Ten-

tacular arms and three upper pairs of sessile arms yellowish white and opaque. Ventral arms bluish white and translucent, like the head and body.

Length from tip of tail to base of dorsal arms, 74^{mm}; to anterior edge of mantle, 50^{mm}; to center of eyes, 64^{mm}; diameter of head across eyes, 8^{mm}; back of eyes, 7^{mm}; diameter of body, 5–7^{mm}; length of caudal fin, 23^{mm}; its breadth in the middle, 13^{mm}; breadth across anterior lobes, 6^{mm}; length of dorsal arms, 11^{mm}; of second pair, 14^{mm}; of third pair, 18^{mm}; of ventral arms, 42^{mm}; of tentacular arms, 60^{mm}; diameter of dorsal arms at base, about 1^{mm}; of third pair, 2^{mm}; of ventral arms, 3^{mm}; diameter of larger suckers, about ·3^{mm}.

The gills and viscera are situated far forward. The gills are short, broad, blunt, with many crowded lamellæ. The stomach has a short, thick, tapering, saccular appendage. The liver is relatively large, short, rounded. Rectum slender, with two well-developed, spatulate anal papillæ. Branchial auricles well-developed, oblong. The pen is very thin and delicate.

Station 2037, in 1731 fathoms, N. latitude 38° 53′, W. longitude 69° 23′ 30″. No. 38,242. Steamer Albatross, 1883.

The only described species which resembles this is *Loligopsis vermicolaris* Rup., but the latter, if the figures can be relied upon, differs in its proportions. It has a still longer and more slender head, while its caudal fin is much larger and has a distinctly cordate outline, broadest across the anterior lobes, which are much larger and broadly rounded. It is, however, evidently congeneric with our species, and should be called *Leptoteuthis vermicolaris.*

Our specimen has the reproductive organs but little developed, and is, therefore, probably immature.

Abralia megalops Verrill.

Amer. Journ. Sci., vol. xxiv, p. 364, 1882; Bulletin Mus. Comp. Zool., vol. xi, p. 105, pl. 3, fig. 4, 1883 (description of young).

PLATE XXVIII, FIGURE 2.

The following description is from the type-specimen, in alcohol.

Small, eyes large; caudal fin, about two-thirds as long as the mantle, and much broader than long, transversely elliptical; 2d and 3d pairs of arms equal; dorsal a little shorter; ventrals shortest. Sessile arms with two rows of hooks, which are replaced by small suckers on the distal third; tentacular clubs with two alternating rows of hooks, and with marginal suckers distally, on each side,

alternating with the median hooks, and with proximal and terminal groups of smaller suckers. Color pale, with numerous small dark brown chromatophores above, larger and more crowded on the head and on the bases of the arms; lower side with several larger, round, symmetrically placed, purplish brown spots, and with minute ones between them.

Length of mantle, 15^{mm}; diameter of body, 7^{mm}; length of fin, 11^{mm}; breadth across fins, 18^{mm}; breadth of head, 7^{mm}; diameter of eye, 4·5^{mm}; length of dorsal arms, 13^{mm}; length of second pair, 14^{mm}; of third pair, 14^{mm}; of tentacular arms, 25^{mm}; of ventral arms, 10^{mm}. Probably this specimen is immature.

The specimen described from the Blake collection is still younger, but the general figure referred to is from the original specimen, described above.

Off Martha's Vineyard, station 1137, in 173 fathoms, Fish Hawk, 1882. Off Barbados, station 294, in 137 fathoms, Blake Exped., 1878–9.

Eledonella Verrill, gen. nov.

General appearance similar to that of certain small species of *Octopus* and *Eledone*. Body oblong-ovate, soft and saccular, without fins. Mantle extending forward as far as the eyes. Gill-opening very wide, extending upward on the sides as far as the dorsal margin of the eyes, which may be partially concealed by the edge of the mantle. Arms slender, the upper ones shortest, the third pair largest. Suckers in a single row. Third arm of the right side hectocotylized by having the terminal half thickened and somewhat shortened, and bearing on its distal half a few very large urceolate suckers, very much larger than any of the others, and quite different in form. Interbrachial membrane short. Eyes well developed, nearly covered by the skin; a mucus-pore close to the anterior ventral border of the orbit. Siphon moderately developed, free only near the tip; posteriorly the basal part of the siphon extends into two commissual muscular bands on each side; the ventral one runs far back, while the lateral curves upward to join the mantle. There is a large median ventral commissure joining the mantle to the visceral mass; thus the gill-chamber is divided into right and left compartments, each of which is sub-divided into a superior and inferior portion. No special cartilages could be seen on the mantle, nor on the siphon. Reproductive organs large, highly colored with large orange chromatophores.

The principal character in which this genus differs from *Eledone* is the peculiar mode of hectocotylization of the third arm in the male. *Eledone* agrees essentially with *Octopus* in this respect.

Eledonella pygmæa Verrill, sp. nov.

PLATE XXXII, FIGURE 2.

Body smooth, oblong-ovate, somewhat depressed, bluntly rounded at the posterior end, narrowed a little anteriorly, back of the eyes. Head rather small, equal in width to the anterior part of the body. Mantle-edge thin, extending far forward, its lateral edge reaching as far as the pupil of the eye, and united to the dorsal integument of the head on a level with the upper surface of the eye. Eyes of moderate size, convex, but not very prominent. Arms rather short, except the third pair, which is much larger than the others; the dorsal pair is considerably smaller and shorter than the others; the second pair is a little longer and united to the first by a small interbrachial membrane, occupying about its basal third; the third arm on the left side, is about twice as long as the dorsal ones and much stouter, tapering to a slender, acute tip, and united to the second by the short interbrachial membrane, but with only a rudimentary membrane between it and the ventral arm; the ventral arms are much smaller and shorter, about equal in length to the second pair, and have no interbrachial web between them. The hectocotylized arm (fig. 2) is somewhat stouter than its mate, but decidedly shorter, though longer than any of the other arms; beyond its middle it bears four large urn-shaped suckers, quite different in size and form from those on the basal half; the first of these special suckers is decidedly the largest, the others decrease in size to the terminal one, which is quite small. These specialized suckers have a broad, swollen, and nearly round basal portion, in breadth exceeding the width of the arm, while toward the summit there is a distinct constriction, and the cup itself expands somewhat, but is decidedly narrower than the basal portion of the sucker; the border of the aperture is somewhat contracted and four-lobed. The basal suckers on this arm and all of those on the other arms are arranged in a single row. They are of moderate size, rather elevated, with the basal portion sessile and a little expanded. The number on each arm is from ten to twelve, besides a few minute ones at the tip; on the basal half of the hectocotylized arm there are four simple ones. Color, a pale bluish white, spotted with rather large purple-brown chromatophores, which are equally numerous above and below, and arranged somewhat in rows on the outer surfaces of the arms.

Length of the body and head, to base of arm, 27^{mm}; length of body to edge of mantle above, 20^{mm}; breadth across body, 14^{mm}; breadth of head across eyes, 11^{mm}; diameter of eye-ball, $4{\cdot}5^{mm}$; length of dorsal arms, 7^{mm}; length of second pair of arms, 9^{mm}; length of third pair, 14^{mm}; length of ventral arms, $7{\cdot}5^{mm}$; length of hectocotylized arm, 11^{mm}; height of largest specialized suckers, 3^{mm}; diameter, 3^{mm}.

Station 2099, N. latitude 37° 12′ 20″, W. longitude 69° 39′, in 2949 fathoms, (No. 35,268 *). Steamer Albatross, 1883.

GASTROPODA.

Pleurotomella Verrill.

Amer. Jour. Science, v, p. 15, 1882; Catal. Marine Mollusca, these Trans., v, p. 453, 1882.

This genus was originally proposed for *P. Packardii*, first taken in deep water in the Gulf of Maine. This species is remarkable for the delicacy and beauty of its sculpture and the great depth of its subsutural sinus. The subsequent discovery of numerous other related species inhabiting the deep waters, off our coast and in other regions, has rendered it necessary to enlarge the limits of the genus and to modify its characters.

As at present understood, this genus is intended to include those species which have a rather broad and very distinct subsutural band, crossed by excurved lines of growth corresponding to the form of the posterior sinus of the lip, which is situated a little below the suture and is always pretty well-developed, but is sometimes broad and shallow, and at other times narrower and very deep. The outer lip is always thin and sharp, without any appearance of a varix, nor is there any deposit of callus on the body-whorl, in front of the aperture. The canal is well developed, generally constricted at the base and somewhat elongated, and usually but slightly curved. In a few of the species, doubtfully referred to the genus, it is short and wide. The columella-margin is more or less sinuous. The nucleus differs in sculpture, and usually in color, from the rest of the whorls, and is generally minutely cancellated by fine raised lines running obliquely in opposite directions. The remaining whorls are elegantly sculptured by longitudinal ribs and revolving cinguli, and usually have a distinct shoulder or carina, which is frequently nodulous, below the

* The numbers given in this paper are those used in the permanent catalogue of the mollusca, in the National Museum.

subsutural band. The animal is destitute of an operculum, and, in all the species hitherto examined, is without eyes. The dentition consists of rather strong uncini, usually with a barbed tip and broad base.

This genus, therefore, resembles very closely the shallow-water genus, *Defrancia*, to which many of the described species have been hitherto referred; but in *Defrancia* the outer lip is thickened, or has a distinct varix, and there is usually a deposit of callus on the body-whorl, especially posteriorly, opposite the sinus, while the animal, in the typical species at least, has well developed eyes.

Pleurotomella Bairdii Verrill and Smith, sp. nov.

PLATE XXXI, FIGURE 1.

Shell large, rather stout, fusiform, with an elevated, acute, turreted spire and eight or nine obtusely shouldered, angular whorls. The last whorl is large and somewhat inflated, with a broad, flattened or slightly concave, sloping subsutural band, which is covered with distinct, strongly receding lines of growth and with more or less evident, raised, spiral cinguli and grooves. Below the subsutural band the whorls are obtusely angulated, but without a distinct carina. Commencing at the shoulder and extending a short distance below it are numerous oblique, not very elevated, longitudinal ribs, which fade out before reaching the middle of the whorls. The whole surface of the whorls, including the ribs, is covered with conspicuous, raised, spiral cinguli, between which there are two or three smaller ones, separated by deep concave grooves of about the same breadth; the whole surface is covered by distinct, raised lines of growth. The aperture is oblong-ovate, rather large; the columella is nearly straight, somewhat prolonged, its inner edge forming a slight sigmoid curve; the canal is short, broad, narrowed at the tip and not recurved; the outer lip is sharp and thin; the posterior sinus is broad and rather deep, with regularly rounded margins, corresponding to the lines on the sub-sutural band; below the shoulder the lip projects considerably forward and then is somewhat flattened and recedes gradually to the base of the short and broad canal. The nuclear whorls are very small and generally eroded so far as to appear smooth.

The shell is white or grayish white, without any distinct epidermis; aperture clear white. The animal is destitute of operculum and eyes.

In the number of specimens examined there is considerable variation in the ratio of length and breadth, depending largely on the

sex; among the several specimens of which the sex was determined the females have the body-whorl slightly more swollen than the males.

Length of one of the largest female specimens, 55mm; breadth, 26mm; length of body-whorl to tip of canal, 40mm; breadth of body-whorl, 22mm; length of spire, 26mm; length of aperture, 27mm; its breadth, 12mm.

It was taken at the following stations by the Albatross in 1883:

Nat. Mus. No.	Station.	N. lat.	W. long.	Fathoms.	
37,824	2,037	38° 53′ 00″	69° 23′ 30″	1721	12 specimens, mostly living.
37,806	2,038	38 30 30	69 08 25	2033	1 specimen, dead.
37,814	2,041	39 22 50	68 25	1608	2 specimens, living.
35,253	2,097	37 56 20	70 57 30	1917	1 specimen, dead.
35,275	2,098	37 40 30	70 37 30	2221	1 specimen, dead.

This species is closely allied to *P. Agassizii*. It is a larger and stouter shell, with the whorls more angulated at the shoulder, and has a broader and more angular aperture. The sculpture differs considerably in details, and the columella is destitute of the pink or pale orange tint usually present in *P. Agassizii*.

Pleurotomella Benedicti Verrill and Smith, sp. nov.

PLATE XXXI, FIGURES 2, 2*a*.

Shell fusiform, moderately stout, with a high, regularly tapered spire, and very convex, shouldered whorls, which have strong, oblique, transverse ribs rendered nodulous by well developed, raised cinguli.

Whorls six, below the chestnut-colored nucleus. The suture is deep, not very oblique. The subsutural band is rather broad, concave, nearly smooth, contrasting strongly with the rest of the whorls; its sculpture consists only of the deeply concave lines of growth, parallel with the notch in the lip. Below the subsutural band the whorls are abruptly swollen, forming a rounded shoulder. The transverse ribs, commencing at the shoulder, are prominently raised, rather oblique, and extend entirely across the whorls of the spire, becoming smaller next the suture; on the last whorl they extend to the base of the canal; they are obtuse at summit and separated by wider, deeply concave interspaces; on the last whorls there are about sixteen ribs. Both the ribs and interspaces are crossed by well marked, somewhat unequal, raised, revolving lines, separated by narrow grooves; these, in passing over the ribs, produce small, somewhat conical, unequal nodules, which give a somewhat rough appearance to the surface of

the shell. One of the spiral lines just above the suture and one or two of those at the shoulder are stronger than the rest. Between the ribs the revolving lines are roughened by fine lines of growth.

The four nuclear whorls (fig. 2*a*) are evenly rounded and in strong contrast with those that follow them. The first one is very minute, forming a very acute apex; the surface is finely cancellated by two sets of lines running obliquely in opposite directions. The aperture is elongated and rather broad in the middle; the outer lip has a deep and broad posterior sinus, below which it projects strongly forward and is regularly arched to the base of the canal; the canal is narrow, nearly straight, slightly prolonged; the columella is straight and tapered, with its inner edge forming a slightly sinuous curve; the inner lip is smooth and polished, with a thin coat of enamel which extends somewhat forward in a regular curve on the body-whorl. The color is white with a pale grayish tinge, with the exception of the nuclear whorls, which are deep chestnut-brown.

Length, 17^{mm}; greatest breadth, 8^{mm}; height of spire, 9·5^{mm}; length of aperture, 8^{mm}; breadth, 3·5^{mm}.

Station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, 1290 fathoms. Albatross, 1883. (No. 38,087).

This fine species has been dedicated to Mr. James E. Benedict, of the U. S. Fish Commission, Naturalist, in charge of the Zoological department on the Albatross.

Pleurotomella Sandersoni Verrill, sp. nov.

PLATE XXXI, FIGURES 3, 3*a*.

Shell small, delicate, fusiform, with an elevated and very acute spire and a slightly elongated, straight canal. Whorls angulated and turreted, sculptured with ribs and revolving lines, which form rows of small, sharp nodules at their intersection around the periphery, and especially at the shoulder. Whorls about four, below the nucleus, which is unusually elongated and composed of four pale chestnut-colored whorls, which are finely and regularly cancellated. The apical whorl is very minute and prominent, giving the spire a very acute tip. The nuclear whorls increase rapidly and regularly in size, and are regularly rounded. The sculpture passes somewhat gradually into that of the next lower whorl, which is distinctly ribbed and carinated, with a single row of sharp tubercles around the middle. The lower whorls of the spire have the shoulder at about the middle, and below it two or three raised cin-

guli, which form as many rows of small acute nodules in crossing the ribs; these are similar to those on the carina of the shoulder, but usually a little smaller. There is commonly another row of smaller tubercles of the same kind just above the shoulder. On the last whorl there are from fifteen to eighteen cinguli, which are unequal in size and decrease in prominence from the carina to the base of the canal; most of these form small, sharp nodules in crossing the ribs. The ribs are a little prominent, rather oblique, sharp at summit, and separated by concave interspaces of somewhat greater width; on the upper whorls they run from just above the shoulder forward to the suture; on the body-whorl they curve strongly forward in the middle and then recede and disappear before reaching the base of the canal. The subsutural band is very wide, strongly sloping, and somewhat concave just above the shoulder; it is covered with numerous, rather conspicuous, thin, raised riblets, which are strongly excurved in the middle and bend forward before reaching the suture. Two or sometimes three cinguli exist on the subsutural band; the uppermost of these is just below the suture and forms there a small carina, above which the suture is distinctly channeled. The surface between the ribs is everywhere covered by fine, distinct, flexuous lines of growth. The aperture is long-ovate, rather narrow, angulated externally; the outer lip is thin and sharp, with a broad, rounded posterior sinus, just above the shoulder and a little removed from the suture; below the shoulder the lip arches forward in a broad curve, and becomes incurved at the base of the canal, which is rather contracted and a little bent to the right and slightly everted at tip. Columella short and nearly straight, its inner edge forming a strong sigmoid curvature. Epidermis indistinct. Color white, with the exception of the light yellowish brown nucleus.

Length of one of the larger specimens, 6·5^{mm}; breadth, 3·5^{mm}; length of body-whorl and canal, 4^{mm}; length of aperture, 3^{mm}; its breadth, 1·25^{mm}.

Station 2038, N. latitude 38° 30′ 30″, W. longitude 69° 08′ 25″, in 2033 fathoms, living, (No. 34,841); Station 2043, N. latitude 39° 49′, W. longitude 68° 28′ 30″, in 1467 fathoms, (No. 34,851); and station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, in 1290 fathoms, living, (No. 38,315). Albatross, 1883. The best specimens occurred at the last named station, in 1290 fathoms.

This species bears considerable resemblance to several others of the same group, but differs very decidedly from all the rest in the character of the nucleus, which is remarkable for its relatively large

size and the number of whorls of which it is composed, and for the sharpness of the tip, due to the prominence and minuteness of the apical whorl. The shell is more slender than most of the related forms and has a rougher appearance, owing to the sharp nodules along the spiral lines. In the latter character it most resembles *P. Benedicti*, but the latter is a much larger and stouter shell, with a coarser sculpture. *P. Saffordi* is a very much shorter and thicker shell, with much stronger sculpture and a very different nucleus.

This elegant species is dedicated to Mr. Sanderson Smith, for many years a member of the Fish Commission parties, and associated with the writer in the malacological work.

Pleurotomella Saffordi Verrill and Smith, sp. nov.

PLATE XXXI, FIGURES 4, 4*a*.

Shell small, thin, delicate, rather short, with very convex and strongly ribbed whorls, a wide, concave subsutural band, and a narrow elongated canal. Whorls five or more, below the nucleus, which consists of three small, chestnut-brown whorls, enlarging gradually, and having the surface covered with minute reticulated sculpture; its apex is slightly obtuse, owing to the first whorl being rounded and depressed, and but little smaller than the second. The whorls below the nucleus enlarge rapidly, the body-whorl being much larger than the others. The subsutural band is relatively wide, distinctly concave, and covered with fine, close, strongly receding, curved lines corresponding to the form of the posterior sinus of the lip; and not crossed by spiral sculpture. Below this band the whorls are suddenly swollen so as to produce a prominent rounded shoulder; the convex part of the whorl is crossed by twelve to fourteen prominent, rather acute, sinuous ribs, which are most prominent on the shoulder, where they bend obliquely forward. The concave interspaces are wider than the ribs. The whole surface below the subsutural band is covered by numerous fine, raised, spiral lines or cinguli of unequal size, and not closely crowded; these in crossing the ribs form minute, obtuse nodules. The ribs disappear at the base of the canal, but the spiral lines continue to its tip. The aperture is broad-ovate, somewhat angulated at the shoulder of the whorl and at the base of the columella. The posterior sinus is broad and moderately deep. The canal is rather elongated, narrow, and somewhat sinuous. The columella is nearly straight for a part of its length, and then its edge becomes strongly, spirally curved where it borders the canal. Shell

white and translucent, with the exception of the nucleus. Epidermis not apparent. Operculum wanting.

Length of one of the largest examples, 10mm; greatest breadth, 5mm; length of body-whorl to tip of canal, 7mm; length of aperture, 5mm; its breadth, 2·5mm.

Stations 2041, 2042, 2043, 2076, 2084, and 2115, in 906 to 1608 fathoms. Albatross, 1883. The greatest number of living specimens occurred at station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, in 1290 fathoms, (No. 38,308).

This is a small and very elegant species, remarkable for the convexity of its whorls, and its very broad subsutural band. The canal is narrower and more constricted at its base than is usual in this genus. The sculpture is strongly marked, but does not give the rough appearance seen in *P. Benedicti*, which is also a longer and more fusiform shell, but has considerable resemblance in its sculpture. *P. Diomedeæ* is also a more elongated shell, with less convex whorls, and its subsutural band is narrower and crossed by conspicuous prolongations of the ribs. It bears some resemblance to *P. formosa* (*Defrancia formosa* Jeff.), but that has less prominent ribs, less conspicuously shouldered whorls, and a differently shaped aperture.

This species is named in honor of W. E. Safford, Ensign U. S. N., who was a member of the Fish Commission party, in 1883.

Pleurotomella Diomedeæ Verrill and Smith, sp. nov.

Plate XXXI, figures 5, 5*a*.

Shell white, delicate, rather small, fusiform, with an acute spire and distinctly angulated whorls, crossed by prominent flexuous ribs, which extend upward to the suture, and with rather coarse revolving lines, usually absent on the wide subsutural band, which is concave at a little distance from the suture. The posterior sinus is rather broad and deep, a little removed from the suture. Whorls four or five below the nuclear whorls, of which there are four. The body-whorl is large and moderately convex, strongly angulated at the shoulder, which is prominent and bears a series of small rounded nodules at the angle of the ribs; above the shoulder the whorls are decidedly concave in line with the posterior sinus, but have a narrow, convex band just below the suture. The subsutural band is crossed by thin but strongly raised continuations of the ribs, which recede in a strong curvature in crossing the concave portion, but advance abruptly and rise into small prominent, narrow or compressed tubercles in crossing the convex portion, close to the suture; at the shoulder the ribs be

come stouter and more prominent, each bearing a small rounded or angular nodule; below the shoulder the ribs are moderately stout, usually rounded or obtuse at summit, but sometimes, especially on the upper whorls, angular or subacute. They are slightly oblique or flexuous and cross the entire breadth of the upper whorls, but fade out about the middle of the last whorl. There are about twenty of these ribs on the last whorl. Strongly marked cinguli cover the whorls below the shoulder, these become coarser and more raised on the anterior part of the last whorl and on the canal, where they are separated by wider concave interspaces, and roughened by the distinct lines of growth crossing them; on the middle of the convexity of the whorl they are less conspicuous and but slightly raised, and not very close together; they are more conspicuous in the intervals between the ribs, the summit of the ribs being but slightly roughened by their crossing, except close to the shoulder, where they often form minute nodules; they are usually wanting on the subsutural band, but are sometimes faintly marked on that portion. Distinct lines of growth, parallel with the lip, cover the surface of the shell and are most distinct on the subsutural band, between the ribs. The aperture is narrow-ovate, angulated posteriorly. The outer lip is thin, projecting forward in the middle in a strong, regular curve, but greatly receding toward the shoulder. The sinus is rather deep and wide, situated just above the angle of the shoulder and separated from the suture by the convex portion of the subsutural band. The columella is sinuous; the canal is a little prolonged, rather narrow, and straight.

The four nuclear whorls are yellowish or pale horn-color, and form a very acute apex when perfect. The first is very minute and somewhat upturned and prominent; the second is also minute; the third and fourth increase rapidly; the first three, in our most perfect specimens, are smooth and somewhat glossy; the fourth is crossed by numerous, thin, delicate, raised longitudinal lines, which are a little oblique and recurved in the middle, but not crossed by another set, as seen in many other species. Color translucent white, sometimes faintly tinged with gray or pink, surface glossy. No epidermis. Operculum wanting.

One of the largest specimens is 11^{mm} long; breadth, $4{\cdot}5^{mm}$; length of body-whorl and canal, $7{\cdot}5^{mm}$; of aperture, 6^{mm}; its breadth, 2^{mm}. Other examples are more slender, with a narrower aperture.

Stations 2037, 2038, 2041, 2042, 2043, 2084, and 2096, in 1290 to 2033 fathoms. It occurred in the greatest numbers, living, at station

2038, N. latitude 38° 30′ 30″, W. longitude 69° 08′ 25″, in 2033 fathoms (No. 34,827); at station 2041, N. latitude 39° 22′ 50″, W. longitude 68° 25′, in 1608 fathoms, (No. 34,828); and station 2096, N. latitude 39° 22′ 20″, W. longitude 70″ 52′ 20″, in 1451 fathoms, (No. 37,790.) Albatross, 1883.

Named in commemoration of the steamer Albatross, (*Diomedea*).

Pleurotomella Emertoni Verrill and Smith, sp. nov.

PLATE XXXI, FIGURE 6.

Shell moderately large, stout, ovate, with the body-whorl very large in proportion to the rest of the shell, and with some of the upper whorls ribbed and nodulous, while the two lower whorls have only spiral lines and lines of growth. Whorls about eight, three of which form a chestnut-colored nucleus; about three whorls below the nucleus are covered with prominent, longitudinal ribs, which form a well marked shoulder and are crossed by several conspicuous, revolving cinguli and grooves, which render them decidedly nodulous. The subsutural band is broad, strongly concave, occupying nearly or quite half the breadth of the upper whorls, and crossed by strongly receding, raised lines, parallel with the lines of growth of the sinus, but without spiral lines. Body-whorl large and swollen, covered throughout with very evident lines of growth, which are crossed, except on the subsutural band, by conspicuous, revolving cinguli, which are separated by spaces considerably exceeding their own breadth. Aperture oblong-ovate, scarcely narrowed at the broad, short, open canal, and with a very wide and rather deep posterior sinus. The outer lip is thin and projects well forward beyond the sinus in a broadly rounded curve. The columella is straight, with a sinuous inner margin; the inner lip is marked by a narrow and thin enamel, which extends but little forward in a sinuous outline. The color is yellowish white under a thin, smooth, glossy, yellowish green epidermis.

Length, 22^{mm}; greatest breadth, 11^{mm}; length of aperture, 14^{mm}; its breadth, 5^{mm}.

Station 2097, N. latitude 37° 56′ 20″, W. longitude 70° 57′ 30″, in 1917 fathoms (No. 35,232). Albatross, 1883.

This species very closely resembles the following, in size and form. It differs in having a wider canal, which is less differentiated from the aperture, and in having the upper whorls strongly ribbed and nodulous. They may possibly prove to be varieties of one species.

Pleurotomella Bruneri Verrill and Smith, sp. nov.

PLATE XXXI, FIGURES 7, 7*a*.

Shell stout-fusiform, with a rather short, regularly tapered spire, a broad and deep posterior sinus, and a very short and wide canal.

Whorls seven, moderately convex, with a wide, concave subsutural band, which is covered with regular, strongly receding, raised lines, but destitute of spiral sculpture. The shoulder is rather prominent where the concave band joins the convexity of the whorl; the rest of the surface is covered with conspicuous, raised, obtuse, unequal revolving cinguli, separated by deep interspaces of nearly the same breadth, on the spire; on the anterior part of the body-whorl the cinguli become broader and flatter, and separated by narrower grooves, which are covered by numerous rather close, raised, longitudinal lines, or lines of growth, which are less conspicuous where they cross the cinguli; this arrangement produces a finely cancellated structure, in which the spiral lines are much more distinct than the others. Aperture narrow-ovate, continuing backward in a broad and deep sinus next the body-whorl. The outer lip is thin and sharp, and projects obliquely forward in a broad curve. The canal is scarcely differentiated from the rest of the aperture; it is short and rather broad, and nearly straight. The columella is straight, with a sinuous inner margin. The inner lip extends forward on the body-whorl in a broad, regular curve, defined by a thin layer of enamel. Operculum apparently wanting. The nuclear whorls are eroded, but are small, regularly spiral, and without any strongly marked sculpture.

Color grayish white, with a pale yellowish green epidermis, which is easily deciduous.

Length 22^{mm}; greatest breadth, 11^{mm}; length of aperture, 14^{mm}; its breadth, 5^{mm}.

Station 2038, in 2033 fathoms (No. 34,846), and station 2041, N. latitude 39° 22′ 50″, W. longitude 68° 25′, in 1608 fathoms (No. 34,834). Albatross, 1883.

This species is dedicated to Mr. H. L. Brüner, who has been a member of the U. S. Fish Commission parties, during the past three years.

Pleurotomella Catharinæ Verrill and Smith, sp. nov.

PLATE XXXI, FIGURES 9, 9*a*.

Shell thin, translucent, white, very slender, elongated, narrow, fusiform, with a long, narrow, tapered, nearly straight canal, and a tall, gradually tapered, acute spire. Whorls eight, evenly rounded,

but not very convex, with a distinct, flattened, smooth subsutural band. Suture well marked, but not deep, decidedly oblique. Surface everywhere covered with conspicuous, regular, raised, revolving cinguli, in some parts with one or more smaller revolving lines in the spaces between them. The cinguli are obtusely rounded and entirely smooth, as well as the spaces between them, which are of about the same breadth; on the penultimate whorl there are about fifteen cinguli, and on the upper whorls five or six.

The large, acute, brown nucleus consists of about four and a half whorls, which increase regularly; the apical whorl is small, rounded and prominent; the others are distinctly carinated and shouldered; the portion above the shoulder slopes at a wide angle and is a little convex and nearly smooth, except close to the carina; the part below the carina of the shoulder is flattened and nearly straight, or even narrowed toward the suture, and crossed by regularly spaced, thin, elevated transverse ribs, with wider intervals; these ribs extend a little above the carina and then fade out; they run nearly straight across all the whorls, except the first two, where they are more or less oblique; there is usually, on the larger whorls, a raised revolving line, or small carina, just above the suture.

The aperture is very elongated and narrowed at the base of the canal, which is much prolonged and slender, a little curved, owing to a slight sinuous curvature of the columella-margin. The posterior notch in the outer lip is rather deep and narrow, situated immediately at the suture. The subsutural band, corresponding to it, shows faint curved lines of growth, parallel with its margin. Color white, except the nucleus, which is pale chestnut-brown.

Length of one of the largest specimens, 23^{mm}; breadth, $6{\cdot}5^{mm}$; height of spire, 11^{mm}; length of aperture and canal, $11{\cdot}5^{mm}$; breadth of aperture, 3^{mm}.

Living specimens at station 2038, N. latitude 38° 30′ 30″, W. longitude 69° 08′ 25″, in 2033 fathoms (No. 34,845); station 2041, N. latitude 39° 22′ 50″, W. longitude 68° 25′, in 1608 fathoms (No. 37,871); station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, in 1290 fathoms (No. 37,846); and at 2115, N. latitude 35° 49′ 30″, W. longitude 74° 34′ 45″, in 843 fathoms (No. 35,597). Albatross, 1883.

This elegant species is dedicated to Miss Katharine J. Bush, who has, for several years, acted as assistant in the working up of the large collections of mollusca, dredged by the U. S. Fish Commission,

and to whom the writer is indebted for important assistance in the preparation of this paper.

It is not very probable that this species properly belongs to *Pleurotomella*. I have placed it here, for the present, only provisionally.

Gymnobela Verrill, gen. nov.

Shell in form and general appearance like *Bela*. Spire generally rather short. Body-whorl swollen. Nucleus with fine cancellated sculpture. Subsutural band not strongly marked. Posterior notch of lip shallow and usually not very distinct. Operculum absent.

Gymnobela engonia Verrill, sp. nov.

Shell somewhat solid, white, more or less translucent, stout-fusiform, with the aperture about equal in length to the spire, which is shouldered, decidedly turreted, and tapered regularly to an acute apex.

Whorls five below the nucleus, strongly angularly shouldered at about the middle, the portion above the shoulder forming a wide, abruptly sloping subsutural band, which is usually slightly concave in the middle, but swells a little where it joins the suture; the whorls are flattened below the shoulder and a little narrowed at the suture, which is strongly impressed. The sculpture on the subsutural band consists of numerous, close, revolving lines, most distinct towards the shoulder, and of small, slightly raised, thin riblets, which are most distinct close to the suture and strongly excurved in the middle of the band, but bend forward strongly to the angle of the shoulder, where most of them disappear or blend with the ribs and lines of growth a little farther forward. Below the shoulder the surface is covered by many, rather thin, closely arranged, revolving cinguli, which on the whorls of the spire are separated by interspaces about twice their own width, but become much closer on the middle of the last whorl, gradually becoming coarser and more widely separated as they approach the canal, those on the anterior part being also thicker and more obtuse. Numerous rather small and slightly elevated ribs commence at the shoulder and curve obliquely forward across the convex part of the whorls, extending to the suture on the upper whorls, but mostly fading out at the middle of the last whorl; these ribs are obtusely rounded and wave-like, the interspaces being shallow, concave, in breadth about equal to the ribs; on the last whorl there are from twenty-five to thirty. On the spire-whorls the

intersections of the cinguli and ribs, which are of about the same size, produce a pretty regularly cancellated structure, but on the last whorl the cinguli are more numerous and less prominent than the ribs. The nucleus is chestnut-brown and consists of about two and a half regularly increasing whorls, the apical one being very small and regularly coiled; this surface appears to have been minutely cancellated by microscopic lines. Aperture irregularly oblong or oblong-ovate, strongly angulated by the shoulder, and decidedly widest at the base of the columella. Canal short, somewhat constricted, nearly straight; outer lip thin, projecting forward below the shoulder, with a broad, rounded, rather shallow sinus at the middle of the subsutural band and a little removed from the suture. Operculum not present in the alcoholic specimens.

Length of one of the largest specimens, 17^{mm}; breadth, 10^{mm}; length of aperture, 10^{mm}; its breadth, $3{\cdot}5^{mm}$; length of body-whorl to tip of canal, 12^{mm}. Another more slender specimen is $15{\cdot}5^{mm}$ long; 8^{mm} broad; length of aperture, 9^{mm}; its breadth, 3^{mm}.

Station 2041, N. latitude 39° 22′ 50″, W. longitude 68° 25′, in 1608 fathoms (No. 34,835); and station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, in 1290 fathoms (No. 37,818).

Gymnobela curta Verrill, sp. nov.

Plate XXXI, figure 10.

Shell small, short, fusiform, or subovate, with a low spire and very large body-whorl, forming about three-fourths the total length. The surface is finely decussated by longitudinal and spiral lines of nearly equal size. Whorls four below the nucleus, very rapidly increasing, strongly convex, but frequently slightly flattened at the periphery, and sometimes distinctly angulated at the shoulder, but more commonly evenly rounded; last whorl very ventricose. Suture strongly impressed, often slightly channelled. The nucleus consists of two or three small, light chestnut-brown whorls, with very finely cancellated sculpture. The apical whorl is very small and regularly coiled, Sculpture on the rest of the shell consists of numerous, rather fine, thin, regular revolving cinguli, which are separated by interspaces about twice their own breadth on the lower whorls, but more crowded on the upper ones. Two or three of the cinguli on the shoulder are usually coarser and a little farther apart than the rest, and the largest of these often forms a slight carina around the most prominent part of the shoulder. On the subsutural band the cinguli are less distinct and less regular, and often partially obsolete. Anteriorly they cover

all the surface to the tip of the canal. The cinguli are everywhere crossed by very numerous and regular, thin, raised lines or riblets, which are usually of nearly the same size as the cinguli, but frequently are somewhat less conspicuous and a little farther apart. The riblets are nearly straight on the periphery of the whorls, but are somewhat angularly bent at the shoulder, and run obliquely forward across the subsutural band to the suture; on the subsutural band they are distinctly elevated, but rather thinner than elsewhere. By the crossing of these two sets of lines the surface is generally finely and regularly cancellated, except on the shoulder and subsutural band, where the cancellation becomes more or less irregular or indistinct. Aperture rather large, broad-ovate, a little angulated at the shoulder, and with a very slight constriction at the base of the very short and rather narrow canal. The posterior sinus is nearly obsolete, and indicated only by a shallow indentation just above the shoulder. Columella short, straight, its inner margin with a rather strong sigmoid curvature. The canal is nearly straight, very slightly recurved at the tip, narrowed by a slight constriction of the outer lip, at its base. Epidermis thin, not very distinct. Color of the fresh alcoholic specimens pale grayish or greenish white, more or less translucent.

Length of a medium sized specimen, 10^{mm}; breadth, 6^{mm}; length of body-whorl and canal, 8^{mm}; aperture, 6^{mm}; its breadth, $2{\cdot}5^{mm}$. One of the largest specimens is 16^{mm} in length; breadth, $9{\cdot}5^{mm}$; length of body-whorl and canal, 12^{mm}; aperture, 9^{mm}; its breadth, 4^{mm}.

Station 2043, in 1467 fathoms (No. 34,854); station 2076, in 906 fathoms (No. 37,812); station 2077, in 1255 fathoms (No. 37,798); station 2084, in 1290 fathoms (No. 37,795); and station 2097, in 1917 fathoms (No. 35,227, one dead specimen); station 2115, in 843 fathoms (No. 37,794). It occurred in the largest numbers at station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, in 1290 fathoms, (twenty specimens, living and dead); and at station 2076, N. latitude 41° 13′, W. longitude 66° 00′ 50″.

Gymnobela curta, var. subangulata Verrill, nov.

Similar in form and size to the preceding, with which it is often associated. It differs in having the whorls more distinctly angulated at the shoulder, with one of the cinguli forming a distinct carina, which is surmounted by a row of small, often acute nodules, produced by the intersection of the longitudinal riblets. There is often another somewhat smaller spiral line below the carina, which also frequently

bears minute nodules. The rest of the surface is cancellated nearly as in the typical form, but the riblets are frequently more conspicuous than the cinguli. Forms intermediate between the variety and the type are of frequent occurrence.

This variety occurred, with the typical form, at stations 2043 and 2084, (No. 37,817 and 37,796). It was also taken at station 2038, in 2033 fathoms (No. 37,797, one dead); and at station 2096, in 1451 fathoms (No. 37,793, one living).

This species may readily be mistaken for *Bela hebes*, especially when somewhat broken and eroded. The nucleus, however, is entirely different and the aperture is narrower anteriorly and shows a more distinct constriction at the base of the siphon, which is narrower and less open than in the latter. The sculpture is also more distinctly and more regularly cancellated.

Bela subvitrea Verrill, sp. nov.

Shell translucent, white, thin but firm, fusiform, moderately stout, with a high, regularly tapered, acute spire, consisting of about six rounded whorls, which are crossed by rather thin, prominent ribs, strongly bent in a sigmoid curve, and having on the lower whorls rather faint spiral sculpture.

Whorls four to five below the nucleus, strongly convex and a little swollen at the rounded shoulder, which is rarely somewhat angulated, and without a definite subsutural band. Suture strongly impressed, the upper part of the whorl rising rather abruptly from it. The nucleus consists of about two small, prominent whorls; the first is small, rounded, slightly mamilliform, and a little prominent; the next, constituting the greater part of the nucleus, increases rapidly and is decidedly prominent and somewhat obliquely placed, and bears about four or five raised, revolving lines, which are sometimes crossed by distinct lines of growth. The suture between the last nuclear whorl and the next is strongly marked and more oblique than any of the others. The remaining whorls are crossed by rather conspicuous, sharp, and rather elevated ribs, which are strongly excurved at and just above the shoulder, curving forward rapidly to the suture, and bending forward more gradually below the shoulder, forming a distinct sigmoid curve. The interspaces between the ribs are much wider than the ribs themselves, distinctly concave, and crossed by rather feeble cinguli, which are usually not apparent on the ribs themselves. On the upper whorls the spiral lines are usually more conspicuous than on the lower ones, but are often indicated chiefly

by rather close, shallow furrows. On the last whorl the ribs extend to the base of the canal before they fade out, and the spiral sculpture becomes coarser and a little more evident on its anterior part and on the canal. The surface is also a little roughened by faint lines of growth, parallel with the ribs. Aperture oblong-ovate, rather narrow; outer lip sharp, thin, projecting forward in the middle in a broadly rounded curve, and slightly receding just above the shoulder, so as to form a broad and shallow sinus a little removed from the suture. Canal nearly straight, a little prolonged, distinctly constricted at its base by the incurvature of the outer lip. Columella straight, tapering anteriorly, its inner edge forming a well-marked sigmoid curve. Epidermis indistinct. Color translucent bluish white. The surface is not glossy, but the texture is more vitreous and delicate than in the more northern and shallow-water species of *Bela*.

Off Cape Hatteras, station 2115, N. latitude 35° 49′ 30″, W. longitude 74° 34′ 45″, in 843 fathoms (No. 35,601, twenty-five living and dead). Steamer Albatross, 1883.

Length of one of the larger specimens, 13·5^{mm}; breadth, 6^{mm}; length of body-whorl and canal, 9^{mm}; length of aperture, 7^{mm}; its breadth, 2·5^{mm}. Among the specimens collected there is some variation in portions; some individuals having the body-whorl relatively large, with the aperture broader and more ovate than in the specimen measured.

This species, in form and general appearance, bears some resemblance to *B. pleurotomaria*, but it is a thinner and more delicate shell, with a translucency not seen in the latter. The whorls are also more convex, the last more ventricose. The ribs are thinner, less numerous, and more strongly recurved below the suture; the spiral sculpture is not so strongly marked, and the nucleus is larger, with much finer spiral sculpture. The aperture and canal are similar in the two species, but somewhat narrower in *B. pleurotomaria*.

Bela subturgida Verrill, sp. nov.

Shell of moderate size, white, translucent, stout-fusiform, with swollen, angulated whorls, and a distinctly turreted, rapidly tapering spire, the sculpture consisting of rather distant ribs and much finer spiral cinguli.

The largest specimen, which is probably immature, has four whorls below the nucleus. The three upper whorls are abruptly angularly shouldered, the portion forming the subsutural band rising nearly at right angles to the shoulder, below which the whorls are flattened

and strongly ribbed by about sixteen prominent, rather narrow, obtuse, nearly straight ribs, which rise into angular points or small, obtuse nodules at the shoulder; the interspaces are wider than the ribs and strongly concave. The ribs and interspaces also extend across the subsutural band to the suture, becoming small above the shoulder. The whole surface is covered by rather slender revolving cinguli, in the form of thin, raised lines, which are most conspicuous in the interspaces and more or less obsolete on the ribs. On the subsutural band the spiral lines are finer and closer, and often indistinct toward the suture, but on the anterior part of the body-whorl they become somewhat coarser and wider apart. The last whorl is much swollen and has the shoulder somewhat rounded, while on the upper whorls there is often a distinct carina at the shoulder. The nucleus is small and prominent, smooth, and consists of about one and a half whorls, of which the apical is turned up obliquely and incurved. The aperture is ovate, broadly rounded externally, and more strongly excavated at the base of the columella. Canal a little elongated, narrow, constricted at the base by the incurvature of the outer lip, and with the opening oblique, owing to the form of the columella margin, but not bent. Columella nearly straight, its inner margin forming a well-marked sigmoid curve, and strongly obliquely twisted at the anterior end.

Length, 9^{mm}; breadth, 5^{mm}; body-whorl and canal, $6{\cdot}3^{mm}$; length of aperture, 5^{mm}; its breadth, 2^{mm}.

Station 2115, N. latitude 35° 49′ 30″, W. longitude 74° 34′ 45″, in 843 fathoms (No. 35,602, two specimens). Steamer Albatross, 1883.

This species has some resemblance to certain forms of the northern *Bela scalaris*. It is a thinner and much more delicate shell, with finer sculpture, and having the whorls less strongly angulated and the form of the aperture and canal somewhat different.

Spirotropis ephamilla Verrill, sp. nov.

Shell elongated-fusiform, with a high, somewhat turreted spire, and a moderately elongated, slightly curved canal. Posterior sinus situated considerably below the suture, close to the shoulder. Whorls moderately convex, strongly angulated near the middle. Below the suture is a broad, flattened or slightly concave subsutural band, covered with coarse and slightly raised spiral lines, with a series of small, rounded nodules close to the suture, and crossed by strongly excurved, sinuous lines of growth, parallel to the edge of the posterior sinus, and receding most at the shoulder, where there are usually two

raised cinguli, or small carinæ, more strongly marked than the others, and bearing each a series of small, rounded nodules where they are crossed by the stronger lines of growth; sometimes these nodules are present only on the uppermost of these two carinæ, which are separated by a narrow interspace. Below the carinæ the whorl rapidly decreases in size, the anterior slope being nearly the same as the posterior one, and of about the same breadth on the spire; this portion of the whorl is crossed by three to five rather coarse, raised, irregular spiral lines, and numerous fine lines of growth, which bend abruptly forward at the shoulder and then curve obliquely downward and forward, crossing both the spiral lines and their interspaces, which are about the same in breadth. On the body-whorl the spiral lines cover the whole surface below the shoulder, becoming coarser and farther apart below the middle, and again becoming smaller and closer together on the base of the siphon. Aperture narrow-ovate and somewhat angulated by the shoulder. Outer lip sharp-edged, with a rather broad and deep posterior sinus, which is deepest at the shoulder; below the shoulder the lip projects forward in a broad even curve to near the base of the canal, where it is somewhat contracted. The canal is moderately long, somewhat contracted at the base, and a little sinuous. The columella has a strong sinuous curvature, and is strongly excavated at the widest part of the aperture. Upper whorls and nucleus eroded in our examples. Epidermis yellowish horn-color, closely adherent. Shell bluish white within the aperture. Operculum well-developed, ovate, dark horn-color.

Length of the shell without the tip, 25^{mm}; length of body-whorl to tip of canal, 17^{mm}; greatest breadth, 10^{mm}; length of aperture, $13{\cdot}5^{mm}$; its breadth, $5{\cdot}5^{mm}$.

No. 35,237, station 2098, N. latitude 37° 40′ 30″, W. longitude 70° 37′ 30″, in 2221 fathoms. One living specimen with only the four lower whorls present. No. 35,220, station 2097, N. latitude 37° 56′ 20″, W. longitude 70° 57′ 30″, in 1917 fathoms. Another similar specimen, but dead and much eroded.

Typhlomangelia Tanneri Verrill and Smith, sp. nov.

PLATE XXXI, FIGURE 8.

Shell long-fusiform, with a high, turreted, regularly tapered, acute spire, all the whorls having, at some distance below the suture, a well-marked, angular shoulder, which is crowned by a series of oblique nodular riblets on all the whorls except the last.

Whorls about eight, rather convex, strongly angulated, with a broad, concave subsutural band above the shoulder. The subsutural band is crossed by delicate, strongly excurved, distinctly raised lines of growth, which recede most at the middle of the band and bend far forward next the suture; a little below the suture there is usually a thin, raised spiral line; the rest of the band is destitute of spiral lines, except close to the shoulder. The upper whorls, just below the nucleus, are crossed by numerous very oblique, moderately elevated, but somewhat conspicuous ribs, of which the number is about eighteen to twenty, and these are separated by concave interspaces, about equal to their own breadth. The ribs terminate abruptly at the shoulder, so as to form there small, obtuse, somewhat angular nodules; but they decrease rapidly in crossing the whorls, and mostly fade out before reaching the suture. The spiral sculpture consists of numerous rather fine, thin, raised cinguli, which cross the ribs and interspaces alike, and are separated by intervals greater than their own breadth. On the last whorl the ribs disappear and only the spiral sculpture remains; the cinguli are here thicker and more elevated, and are roughened by numerous close, raised lines of growth, which cross both the cinguli and their interspaces; at the base of the canal the spiral lines become finer and closer. The nuclear whorls are somewhat eroded in our specimen. There are apparently two small, rather prominent, regularly spiral whorls. The aperture is narrow, oblong-ovate, strongly angulated at the shoulder and contracted above it, at the notch. The outer lip is thin and sharp, projecting considerably forward and broadly rounded below the shoulder. Posterior sinus a rather deep and very broad, well rounded notch, separated a little from the suture, the deepest part corresponding to the middle of the wide subsutural band. Canal rather broad and short, scarcely differentiated from the aperture. Columella nearly straight, its inner margin with a slight sigmoid curvature; inner lip somewhat excavated in the middle and covered by a thin layer of enamel. Color brownish white, without luster. Epidermis inconspicuous. Operculum dark horn-color.

Length of the single specimen obtained, 21^{mm}; breadth, 9^{mm}; length of body-whorl and canal, 14^{mm}; length of aperture, 10^{mm}; its breadth, 3^{mm}.

Station 2084, N. latitude 40° 16′ 50″, W. longitude 67° 05′ 15″, in 1290 fathoms. (One specimen, No. 38,067.)

This species bears considerable resemblance to *T. nivale* (Lov.) Sars, of Europe, but is distinct in the character of its sculpture. It

also resembles *Spirotropis ephamilla*, but the latter has a deeper notch, more remote from the suture, its subsutural band is broader, and the shoulder of the whorls less marked, while the canal is longer and more constricted at its base.

RACHIGLOSSA.

Marginella borealis Verrill, sp. nov.

Marginella carnea Verrill, Catal. Mar. Moll., Trans. Conn. Acad., v, p. 489, (*non* Storer.)

Plate XXIX, figure 4.

Shell of medium size, solid, smooth, somewhat shining, with a rather elevated, acute spire, showing all the whorls, of which there are about five. Last whorl somewhat swollen, with a slightly prominent, rounded shoulder, considerably below the suture.

The whorls of the spire increase regularly in size and are slightly convex; the nuclear whorls are smooth, polished, shining, evenly rounded. Suture distinct, though filled up with the thin coating of enamel that covers the spire, but does not conceal its structure. The aperture is narrow, expanding a little anteriorly, towards the canal, which is evenly rounded at the tip. The outer lip is thickened by a stout rib, evenly rounded externally, and faintly crenulated on the inner margin, especially on the anterior half. The posterior sinus is distinctly marked as a smooth, rounded groove, surrounded by callus, at the junction of the lip with the body-whorl. The inner lip has a conspicuous, raised, ovate patch of white callus along the posterior half, covering the adjacent portion of the body-whorl, and extending backward more or less on the spire; on the anterior half there are four oblique, stout, prominent plications, nearly equal in height; the most anterior of these is formed by the twisted inner edge of the columella, forming the inner border of the canal; the most posterior is less oblique and often a little smaller than the others. The callus extends along the lower lip, outside of the plications, to the anterior border of the canal, sometimes, when best developed, forming by its outer margin a slight groove. Shell yellowish flesh-color, varied with whitish; sutural lines, callus deposits, plications, and inner margin of the outer lip, white; external surface of the thickened outer lip usually with three orange-yellow spots, the largest of which forms a narrow, elongated patch along the anterior and outer border of the canal, extending somewhat backward along the lip; the next is usually a broader, oblong patch, just below the shoulder; the third is a small, rounded spot close to the suture. Frequently the anterior

spot is divided into two by a patch or band of whitish at the base of the canal; sometimes the middle spot is also divided into two, and in other cases the posterior spot is as large as the middle one. There is usually a faint, whitish revolving band at the shoulder and another at the base of the canal. Interior salmon-colored.

Length, 14^{mm}; breadth, 7·5^{mm}; length of body-whorl, 12^{mm}; length of aperture, 10^{mm}; its breadth, about 1^{mm}.

Several perfect living specimens were taken by the Albatross, in 1883, at stations 2011 and 2012, in 81 and 66·5 fathoms, off Norfolk, Va. (Nos. 35,307 and 35,375.) Dead specimens were taken off Martha's Vineyard by the Fish Hawk, in 1880 and 1881, in 64·5 to 100 fathoms.

The occurrence, so far northward, of a large and well developed species of this almost tropical genus is remarkable. It inhabits, however, only the warm zone along the inner edge of the Gulf Stream, where it is associated with *Solarium*, *Dolium*, *Avicula*, and other southern genera.

This handsome species bears some resemblance to *M. carnea* and *M. roscida*, from our southern coasts, in size and color, but differs from both those species in having a much higher and more acute spire, with all the whorls distinctly visible, and in the form and arrangement of the plications.

This species is also related to *Marginella limatula* Conrad, of which I have examined several specimens from the Miocene of Pagan Creek, Va. The latter differs, however, in being a stouter and broader-shouldered shell, with a much lower spire, in which the sutures are more concealed by the deposit of callus. The fossil form is, therefore, evidently more closely related to, if not identical with, *M. apicina** and *M. roscida*, found in shallow water on our southern and Gulf coasts, than to the present species. The number and position of the plications on the columella and the crenulations on the outer lip are the same as in *M. borealis*.

Volutella lachrimula Gould.

Proc. Boston Soc. Nat. Hist., viii, p. 281, 1862; Otia Conch., p. 238.

Taken in considerable numbers at station 2109, off Cape Hatteras, in 142 fathoms, by the Albatross, 1883.

* This form seems to me essentially identical with *M. conoidalis* Kiener, of the West Indies. It seems to me probable that both are identical with the fossil *M. limatula*. *M. roscida* is probably only a local variety.

Originally described from off Georgia, in 400 fathoms. According to Mr. W. H. Dall, it is found in shallow water on the west coast of Florida (Proc. Nat. Mus., vol. vi, p. 324, 1883).

Buccinum abyssorum Verrill and Smith, sp. nov.

PLATE XXXI, FIGURES 11, 11*a*, 11*b*.

Shell thin, white, with a high, acute spire and strongly carinated whorls. Whorls seven to eight, strongly convex, angulated by the sharp revolving carinæ, of which there are usually three very prominent ones on the whorls of the spire. The upper one of these is situated at a considerable distance from the suture and forms a prominent shoulder, above which the surface of the whorl is somewhat concave and covered with several much finer, raised, spiral lines, of which one, usually at about the middle, is a little more prominent than the rest; the second carina is situated below the middle of the whorl and is separated from the upper one by a broad, concave interspace, which is covered by rather fine, distinct, raised spiral lines, separated by very distinct grooves of about the same breadth; the third carina is usually situated just above the suture, but is sometimes concealed by it; it is separated from the second carina by a concave, spirally lined interspace, a little narrower than that between the first and second carina. On the last whorl there are usually two or more similar, but somewhat less prominent, carinæ below the middle of the whorl, and the surface is everywhere covered by regularly spaced spiral lines or cinguli and grooves. Aperture rather small, somewhat semicircular; the outer lip is nearly regularly rounded from the suture to the base of the canal, but is slightly angulated at the carinæ. In some of the larger specimens it somewhat recedes, and is slightly everted just below the suture. The canal is short, somewhat narrowed, nearly straight, or sometimes with the anterior end a little everted. The columella is nearly straight, its inner margin having a slight sigmoid curvature; the inner lip is covered by a very thin coat of smooth enamel, which extends out only a slight distance beyond the edge of the lip, with a broadly curved outline. The nuclear whorls are small and regularly spiral, consisting of rather more than two turns, and have the surface smooth and glossy. On the succeeding whorl there are about four distinct carinæ. The epidermis is inconspicuous or wanting. The operculum is rounded-elliptical, considerably smaller than the aperture, with the nucleus situated near the outer edge, in front of the middle. The animal is destitute of eyes; the tentacles are long, slender, and gradually tapered.

Length of one of the largest specimens, a female, 43mm; its breadth, 24mm; length of spire, 25mm; length of body-whorl to end of canal, 29mm; length of aperture, 21mm; breadth, 12mm; length of operculum, 11mm; breadth, 8mm.

This species was taken at station 2051, in 1106 fathoms; 2052, in 1098 fathoms; 2074, in 1309 fathoms; 2076, in 906 fathoms; 2077, in 1255 fathoms; 2094, in 1022 fathoms; 2102, in 1209 fathoms; 2103, in 1091 fathoms; 2111, in 938 fathoms. It was most abundant at stations 2074, N. latitude 41° 43′, W. longitude 65° 21′ 50″, where twenty-five living and seven dead specimens were taken (No. 38,319); station 2077, N. latitude 41° 09′ 40″, W. longitude 66° 02′, eighteen specimens, nine living (No. 35,008); and station 2094, N. latitude 39° 44′ 30″, W. longitude 71° 04′, twelve specimens, seven living, (No. 34,691).

This species shows considerable variation of length to breadth, many specimens being more slender than the one measured above. The carinæ also vary in prominence; in some specimens they are strongly raised and very conspicuous, and in others they are but little more elevated than the revolving lines that cover the rest of the surface. It shows scarcely any resemblance to the several species hitherto known from our coast. In general appearance it resembles the *Buccinopsis striata* Jeff., figured in the "Depths of the Sea," p. 464, fig. 76, but not described.

Sipho obesus Verrill, sp. nov.

Shell of moderate size, stout-fusiform, with a rather short, rapidly tapering and bluntly pointed spire, sculptured by many strong transverse ribs and numerous spiral lines. Epidermis with slender hairs along the spiral lines.

Whorls four to five, besides the nucleus, increasing rapidly, evenly rounded, but only moderately convex. On the upper whorl, next the nucleus, the spiral cinguli are somewhat prominent and nearly as broad as the concave interspaces; on the second whorl below the nucleus there are seven or eight cinguli, which are crossed by the conspicuous lines of growth and by distinct, but not very prominent ribs; on the next whorl the ribs are about sixteen in number, and become much more prominent, separated by concave interspaces, which about equal the ribs in breadth; the ribs are most prominent on the convex part of the whorls, where they are excurved. On the body-whorl the ribs become less conspicuous, but extend below the middle of the whorl, fading out towards the base of the canal.

The cinguli, which are very numerous on the lower whorls, are mostly thin, fine, and much elevated, but are rendered conspicuous by the close row of fine, sharp, epidermal hairs rising from each spiral line. The lines of growth are very numerous and close, thin, raised lamellæ. The suture is not very oblique and a little impressed, and has a wavy or crenulated outline, due to the ribs, which extend to the suture, both above and below. The nucleus is rather small, composed of about two whorls. The apical whorl is very small, smooth, and regularly coiled, but only a little exposed; the second whorl shows traces of spiral lines. The outer lip is sharp, thin, regularly curved, and not very convex. The columella-lip is strongly excavated in the middle, and the columella-margin has a strong sigmoid curvature and a spiral twist. The canal is rather broad, moderately long, rather strongly bent to the left, and a little turned up at the end. The aperture is elongated-ovate, with the inner margin a little more convex than the outer. The operculum is long-ovate, rounded posteriorly, but with the anterior end narrowed and a little incurved on the inner margin, near the anterior end, but somewhat dilated into a rounded lobe in the middle; the nucleus is situated on the inner margin, close to the anterior end. Epidermis distinct, finely hairy along the spiral lines, dull greenish yellow in color. In alcohol the shell is dull pinkish white, and the young specimens are more or less translucent.

Length of one of the larger specimens, 25^{mm}; breadth, 14^{mm}; length of body-whorl and canal, $19{\cdot}5^{mm}$; length of aperture, 15^{mm}; its breadth, $5{\cdot}5^{mm}$.

Station 2115, N. latitude 35° 49′ 30″, W. longitude 74° 34′ 45″, in 843 fathoms (No. 35,600). Many specimens, both young and adult, part of them living.

Some of the specimens show considerable variation from the type described. In some the spiral cinguli are larger, more prominent, and more unequal in size, three or more smaller ones being usually situated between the more prominent ones on the lower whorls. The suture in some cases is deeper and slightly channelled.

This species is more nearly related to *S. cælatus*, var. *hebes*, than to any other described species, but it is a larger, much stouter and coarser species, with the spiral sculpture more conspicuously developed, and with a distinctly hairy epidermis. The canal is longer and much more bent. The nucleus is larger and somewhat different in form. The typical form of *S. cælatus* is still more slender, and has a decidedly higher and more regularly tapered spire, with the suture much more impressed.

Sipho profundicola Verrill and Smith, sp. nov.

PLATE XXXI, FIGURE 13.

Shell thin, stout-fusiform, with very convex, evenly rounded whorls and a moderately elevated, somewhat acute, turreted spire, which occupies nearly one-half the length of the shell. Whorls six or seven, the apex eroded in all of our specimens, apparently with a small regularly spiral nucleus. The whorls increase rather rapidly and are separated by a deeply impressed suture. The sculpture on the two lower whorls consists of strongly marked, narrow, prominent spiral cinguli, which are somewhat unequal in size, and separated by wider, concave interspaces, which are crossed by distinctly raised, but delicate and close, lines of growth, due largely to the epidermis rising in scale-like forms. These lines of growth are less conspicuous over the spiral ribs, which they render somewhat uneven. The upper whorls have, in addition to the small spiral cinguli, a pretty distinctly marked carination at the shoulder, and are crossed by slightly elevated, longitudinal ribs or folds, which produce a series of slightly raised nodules where they cross the larger carina at the shoulder. On the penultimate whorl there are from fourteen to sixteen revolving cinguli. Aperture long-ovate, broadly rounded in the middle. The outer lip is thin and evenly rounded from the suture to the base of the canal, where it forms a sinuous curve. The canal is short, narrow, somewhat constricted at the base and nearly straight, except near the end, where it is slightly recurved. Columella not much bent, its inner edge with a slight sigmoid curvature. The operculum is thin, ovate, with the inner margin more convex than the outer, and with the posterior margin evenly rounded and the anterior end slightly curved to the obtuse tip, which shows no spiral structure. The operculum is rather small as compared with the size of the aperture. Epidermis is thin but distinct, not hairy, though rising into scale-like edges along the lines of growth. Its color is pale brownish yellow.

The only specimen with the animal is a male (from station 2038), the largest in the collection. The tentacles are long, slender, tapering to acute tips. No eyes can be detected in the preserved specimen. The other specimens show some variation in the proportion of length to breadth and in the size and closeness of the revolving cinguli, which are sometimes pretty regularly alternately larger and smaller.

Length of the largest specimen, male, 40^{mm}; breadth, 23^{mm}; length

of body-whorl and canal, 30^{mm}; length of aperture, 25^{mm}; its breadth, 12^{mm}; breadth of canal at base, 5^{mm}; height of spire, 18^{mm}; length of operculum, 12^{mm}; its breadth, 8^{mm}.

This species occurred at stations 2037, N. lat. 38° 53′, W. long. 69° 23′ 30″, in 1731 fathoms, four dead (No. 37,999); station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fath., one living specimen (No. 38,411); station 2097, N. lat. 37° 56′ 20″, W. long. 70° 57′ 30″, in 1917 fath., four dead (No. 35,250); and station 2106, N. lat. 37° 41′ 20″, W. long. 73° 03′ 20″, in 1497 fath., one dead (No. 35,465).

Sipho profundicola, var. dispar, nov.

Shell of medium size, stout-fusiform, with very convex, rounded whorls, the upper ones with both transverse ribs and spiral lines; the lower ones with spiral lines only. Whorls about six, besides the nucleus, which is eroded. They are slightly shouldered and somewhat turreted and increase rapidly in size. The upper ones have stout, raised spiral lines or cinguli, of unequal size, and mostly acute at summit, separated by wider, concave interspaces; they are also crossed by many rather feebly marked transverse ridges, most distinct at the shoulder; these disappear on the lower whorls, on which there are numerous, conspicuous, unequal, mostly strongly raised, spiral lines, which cover the whole surface. One of these, considerably larger than the rest, forms the angle of the shoulder; above this the whorls descend somewhat abruptly to the suture, but with a convex outline; just below the angle the whorls are a little flattened and then are convexly rounded. The more prominent of the cinguli are somewhat thickened and obtusely rounded; between these there are from three to five smaller and thinner ones. The interspaces are strongly concave and broader than the raised lines; both the cinguli and interspaces are crossed by crowded, thin, raised lines of growth, along which the epidermis rises into small, short hairs, or thin scales. Aperture ovate, rather broad, slightly angulated at the shoulder. Canal moderately long, rather narrow, somewhat bent to the left, and slightly turned up at the end. Columella strongly sinuous, with the inner margin sharp and decidedly twisted along the margin of the canal. Body-whorl decidedly excavated along the inner lip. Operculum broad-elliptical, with the nucleus at the anterior edge, yellowish horn-color. Shell internally bluish white. Epidermis pale greenish yellow.

Length of the largest specimen, 30mm; breadth, 17mm; length of body-whorl to tip of canal, 23mm; length of aperture and canal, 19mm; breadth of aperture, 8mm.

A living specimen was obtained at station 2042, N. lat. 39° 33′, W. long. 68° 26′ 45″, in 1555 fathoms (No. 37,955), by the Albatross.

This species bears little resemblance to any of those previously described from our coast. It is a larger and much stouter shell than *S. pygmæus*, with much more convex whorls, and the latter species is without transverse ribs on the upper whorls. The last named character shows an affinity with *S. cælatus* and *S. glyptus*, but these are both smaller and more slender, and are ribbed in a much higher degree.

Sipho cælatus, var. **hebes** Verrill, nov.

This variety differs from the typical form in having the spire shorter, and more abruptly tapered toward the tip, and in having the whorls somewhat flattened, with the suture shallower, so as to give the shell a more cylindrical form. The ribs are numerous and well developed on all the whorls below the nucleus, and are distinctly excurved on the most convex part of the whorls. The lines of growth are thin and close, but are distinctly raised, and run parallel with the ribs. The spiral cinguli are very numerous, rather thin, not very prominent, often nearly obsolete on the last whorl. The operculum is ovate or pear-shaped, with the anterior end obtusely pointed and a little incurved, with the nucleus at the inner edge, near the anterior end, and showing a very slight tendency to the subspiral structure.

This form occurred at station 2003, N. lat. 37° 16′ 30″, W. long. 74° 20′ 36″, in 640 fathoms, three specimens, one living (No. 35,659); station 2077, N. lat. 41° 09′ 40″, W. long. 66° 02′, in 1255 fath., one living specimen (No. 38,015) and station 2103, N. lat. 38° 47′ 20″, W. long. 72° 37′, in 1091 fath., one living and one dead (No. 35,424).

Sipho (Mohnia) cælatulus Verrill, sp. nov.

Shell small, fusiform, with an elevated, acute spire, the lower whorls with transverse ribs and raised spiral lines, the upper ones usually without ribs; in general appearance resembling *S. cælatus*, but with the spire more elevated and acute and the ribs less strongly developed. Whorls about seven, moderately convex, not distinctly shouldered; suture rather deep, simple. The nucleus is small, smooth and little prominent, consisting of about two whorls; the api-

cal whorl is very small, closely and regularly coiled, largely covered by the next whorl, which is at first smooth, then shows delicate spiral lines which gradually become stronger; the next two whorls are covered with rather strong, elevated, spiral cinguli, unequal in size and obtuse at summit, separated by interspaces of about the same width. The first whorl below the nucleus has four or five cinguli; the next has one or more smaller lines in each of the interspaces between the primary ones; the succeeding whorl has about ten to twelve prominent cinguli, with some additional ones of smaller size; on the lower whorls the cinguli become much more numerous, covering the whole surface, the most prominent surrounding the periphery and having three to five smaller ones between them; just below the suture the cinguli are often less prominent than elsewhere, and are rendered wavy by transverse ribs. The two upper whorls, below the nucleus, are generally destitute of transverse ribs, or have them but slightly developed; on the succeeding whorls they become somewhat more conspicuous; they are broad, low, rounded at the summit, nearly straight, but a little receding just above the middle of the whorls, and are evenly spaced, having concave intervals about equal to their own breadth. On the lower whorls there are about twelve to fourteen of these ribs. Both the ribs and interspaces are equally crossed by the revolving cinguli, and their entire surface is covered by fine, close, raised or slightly lamelliform lines of growth. Outer lip sharp, thin, rather evenly rounded, contracted at the base of the canal, which is moderately long, narrow, twisted, and a little recurved. Aperture long-ovate, rather narrow, regularly incurved on the inside. Columella strongly bent and spirally twisted in a sigmoid curve. Operculum broad-ovate, obtusely rounded at the anterior end, with the nucleus situated slightly within the margin of the inner edge, from which the lines of growth diverge in a subspiral manner. There is often a slight notch on the inner margin, just back of the nucleus. Epidermis inconspicuous. Color, in alcohol, pale pink or pinkish white, translucent, usually white or yellowish white when dried.

Length of one of the larger specimens, 21^{mm}; breadth, 9^{mm}; length of body-whorl and canal, 14^{mm}; length of aperture, 10^{mm}; its breadth, 4^{mm}. Other specimens are decidedly stouter than the one measured.

Station 2048 (No. 34,832); sta. 2051 (No. 35,259); sta. 2052 (No. 35,229); sta. 2072 (No. 38,052); sta. 2076 (No. 35,149); sta. 2077 (No. 35,248); sta. 2084 (No. 35,185), in 547 to 1290 fathoms. It occurred in most abundance at stations 2076, N. lat. 41° 13′, W.

long. 66° 00′ 50″, in 906 fathoms, one hundred and twenty-five specimens, seventy-five living; station 2077, N. lat. 41° 49′ 40″, W. long. 66° 02′, in 1255 fathoms, fifty-five specimens, twenty-five living; and station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms, one hundred and fifty specimens, seventy-five living.

This species might readily be mistaken for *S. cælatus* V., but the latter has a shorter, less acute and more abruptly tapered spire, a shallower suture, and the transverse ribs are prominent even on the whorls next to the nucleus. The sculpture, however, on the lower whorls agrees very closely. The operculum differs in form and structure. *S. glyptus* has the spire longer and more acute, with the nucleus more prominent and different in form. Its spiral sculpture is more highly developed and quite distinct in appearance from that of the present species. Although this species is referred to the subgenus *Mohnia*, on account of the subspiral structure of the operculum, this feature is less marked than in *Mohnia Mohnii*, the type of the group, as established by Friele, in this respect agreeing nearly with *Sipho* (*Mohnia*) *parvus* V. and S. In fact, in respect to the operculum, it is somewhat intermediate between typical *Sipho* and *Mohnia*.

Sipho (Mohnia) simplex Verrill, sp. nov.

Shell small, short-fusiform, thin, delicate, somewhat translucent, with evenly convex whorls, and with numerous fine spiral lines and raised lines of growth, but without ribs. Canal short, nearly straight. Spire rather short, regularly tapered, acute. Whorls five or six, evenly rounded, rather convex. Suture well impressed, simple. The nucleus is very small, smooth, with the apical whorl minute, regularly spiral and largely concealed by the next whorl. Faint spiral lines commence on the second whorl. On the first whorl below the nucleus there are four or five thin, sharp cinguli; on the next these increase to ten or twelve, which are nearly equal, moderately raised, and separated by interspaces of about their own width; on the body-whorl the cinguli become very numerous and very regular, covering the whole surface to the base of the canal, but some of those around the periphery are somewhat thicker than the rest, with the summit somewhat obtuse or flattened; alternating with these are others of smaller size and thinner. The whole surface, both of the cinguli and interspaces, is crossed by very numerous, close, thin, raised, lamelliform lines of growth, which recede on the more convex part of the whorl, but bend forward toward the

suture. Aperture rather broad-ovate, narrowing gradually to the canal, without any marked constriction. Canal short, rather broad, wide at base, narrowing toward the tip. Columella nearly straight, slightly sigmoid toward the tip. Operculum small, pear-shaped, narrowed anteriorly, with the inner edge slightly incurved, and with a minute notch close to the tip, just behind the minute subspiral nucleus, which is situated just within the margin, much as in the preceding species and *S. parvus*. Epidermis thin, occasionally rising into minute scales and points along the lines of growth, especially near the suture. Color, in alcohol, dull pinkish white. Nuclear whorls pale brownish.

Length of one of the largest specimens, 14^{mm}; breadth, $7{\cdot}5^{mm}$; length of body-whorl and canal, 10^{mm}; length of aperture, 8^{mm}; its breadth, $3{\cdot}5^{mm}$.

Station 2115, N. lat. 35° 49′ 30″, W. long. 74° 34′ 45″, in 843 fathoms, three living specimens (No. 35,573); and station 2055, N. lat. 42′ 32″, W. long. 68° 17′, in 99·5 fathoms, one dead specimen.

This species has some resemblance to *Mohnia Mohnii* Friele, for a specimen of which I am indebted to the kindness of Mr. Friele. The latter is a less delicate shell, with coarser spiral lines, and with much larger nuclear whorls, and the operculum is much more distinctly spiral, its nucleus being larger and farther from the edge.

S. concinnus (*Fusus concinnus* Jeff.), is also similar to our species in form and size.

Sipho leptaleus Verrill, sp. nov.

PLATE XXXI, FIGURE 14.

Shell small, fusiform, glossy white, with five whorls, which are very convex, slightly carinated and angulated in the middle, on the lower whorls. Suture well impressed. Spire elevated, regularly tapered, acute. The sculpture consists of numerous regular, thin, delicate, raised, longitudinal ribs, which are bent in a sigmoid curve, the part corresponding to the most prominent angle of the whorls strongly receding; and of fine, microscopic, wavy revolving lines between the ribs. There is usually a distinct internal line, just below the suture. Aperture irregularly ovate, rather narrow, elongated. Outer lip thin, rounded to the base of the canal, which is somewhat lengthened, oblique, and a little twisted. The columella-margin of the canal forms a sigmoid curve. Nucleus prominent, rounded, consisting of about one whorl and a half, covered with fine spiral lines.

Length, 3·5^{mm}; breadth, 2^{mm}; length of body-whorl and canal, 2·3^{mm}; length of aperture, 2^{mm}; its breadth, about 1^{mm}.

Off Martha's Vineyard, station 1143, in 452 fathoms, soft mud, 1882. One specimen.

The affinities of this shell are doubtful, as the animal and operculum are both unknown. The sculpture resembles that of some Pleurotomidæ.

Trophon Lintoni Verrill and Smith, MSS.

Verrill, Amer. Journ. Sci., vol. xxiv, p. 365, November, 1882.

PLATE XXIX, FIGURE 1.

Shell stout, rough, with six very convex, somewhat shouldered whorls, crossed by about nine very prominent, thick, obtuse ribs; whole surface covered with strong, elevated, obtuse, scaly, revolving cinguli, usually alternately larger and smaller, separated by narrow, deep grooves; they are crossed by arched scales or lines of growth. Aperture broad; canal short, narrow, a little curved; umbilical pit distinct, but small.

Length, 28^{mm}; breadth, 17^{mm}; length of canal and body-whorl, 19^{mm}; length of aperture, 15·5^{mm}; its breadth, 7·5^{mm}.

Named in honor of Professor E. Linton, a member of the Fish Commission parties in 1882 and 1883.

Off Martha's Vineyard, station 1118, in 70 fathoms, Fish Hawk, 1882. One specimen. No other example has been taken.

Trophon clavatus G. O. Sars.

Moll. Reg. Arct. Norvegiæ, p. 249, pl. 15, fig. 12; pl. 23, fig. 14, and pl. IX, fig. 17 (dentition).

This species is rather common in our deeper dredgings.

It agrees very well with Sars's descriptions and figures. Among our numerous specimens there is considerable variation in form, and in the number and prominence of the thin elevated ribs.

It occurred at station 2035, in 1362 fathoms; sta. 2037, in 1731 fath.; sta. 2038, in 2033 fath.; sta. 2041, in 1608 fath.; sta. 2042, in 55 fath.; sta. 2043, in 1467 fath.; sta. 2076, in 906 fath.; sta. 2084, in 1290 fath.; sta. 2096, in 1451 fath.; sta. 2115, in 843 fath.

It was most abundant at sta. 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fath., twenty specimens (No. 34,847); sta. 2076, N. lat. 41° 13″, W. long. 66° 00′ 50″, in 906 fath. (No. 38,041),

eighteen living specimens; and sta. 2115, N. lat. 35° 49′ 30″, W. long. 74° 34′ 45″, in 843 fath. (No. 35,583), forty living. It was taken by Sars, off Lofoden, in 120 to 200 fath.

TÆNIOGLOSSA.

Benthodolium Verrill, gen. nov.

Shell rather large, shape somewhat intermediate between *Buccinum* and *Dolium*. Spire moderately elevated. Whorls convex, last one ventricose. Aperture large, broad, somewhat semicircular. Canal very short, scarcely differentiated from the aperture, formed chiefly by the eversion and turning up of the anterior end of the columella-margin. The columella-lip is thickened and sinuous, extending over the umbilical region. A distinct, well defined layer of enamel, on the body-whorl, connects the outer lip with the columella. No umbilicus. The operculum is large, moderately thick, horny, ovate or subcordate, with a large, spiral nucleus, situated a little within the margin of the broad anterior end, which is slightly emarginate in the middle, opposite the nucleus.

The animal, in alcohol, has a broad head, with large, stout, tapering, acute tentacles, apparently without any trace of eyes. Proboscis moderately long. The siphon is indicated only by a short rounded fold of the mantle-edge. The foot is short and broad, bluntly rounded behind, with a deep transverse groove in the front margin. Gills very unequal in size, the lower only about half the length of the upper.

The odontophore, in the type-species, is small and short, with teeth somewhat like those of *Dolium*. The rachidian tooth is broad, with a large, sharp central cusp and six or more small denticles on each side; the inner lateral tooth is large, strongly curved, with a sharp terminal cusp, and several small lateral denticles on the outer margin; the two outer rows are much alike; these teeth are long, slender, curved, with sharp tips. On each side of the cavity of the proboscis there is a chitinous patch, closely covered with small chitinous scales or denticles, which are closely crowded together and imbricated; the largest of these denticles are flattened and have their free end lanceolate and acute.

Benthodolium abyssorum Verrill and Smith, sp. nov.

PLATE XXXI, FIGURES 12, 12*a*, 12*b*.

Shell large, thin, stout, with inflated whorls, and a short, obtuse spire. Whorls five, below the nucleus, rapidly increasing, evenly

rounded, strongly convex, the last whorl occupying more than one-half the length of the shell. Suture deep, well impressed, the whorls rising abruptly from the suture produce a well rounded shoulder. Aperture broadly ovate; outer lip thin, sharp, with a nearly evenly rounded outline, the edge receding a little at the shoulder and slightly everted near its junction with the whorl; inner lip continued as a thin lustrous coat of white enamel on the previous whorl, becoming raised, sharp, and slightly sinuous in the umbilical region, and turning outward so as to nearly conceal a narrow umbilical chink. Columella short, not much thickened, with a slight sigmoid curvature. Canal very short, and wide, scarcely projecting beyond the margin of the outer lip, with which it is directly continuous. Sculpture consists of numerous small, but very distinct, elevated, spiral cinguli, somewhat unequal in size, but rather evenly spaced, and separated by much wider concave interspaces (about 1^{mm} broad), crossed by rather conspicuous and regular, raised lines of growth, which also cross the ribs. There is no indication of longitudinal ribs. Epidermis distinct, thin, brownish yellow, not hairy. The apical whorls are eroded. Operculum spiral, large, thin, ovate, inequilateral; the outer edge evenly rounded; the inner edge not so strongly convex and slightly sinuous posteriorly; the anterior edge slightly emarginate, where the spiral portion turns inward. The anterior portion shows a distinct spiral whorl, having its center a little distance from the anterior border, and the lines are curved radially from the center.

Color of the shell white and translucent beneath the yellowish epidermis. The operculum is horn-color, translucent.

The only specimen in the collection is a female. The tentacles are large, broad, stout, rapidly tapering to the acuminate tips. No eyes can be detected in the preserved specimen.

Length, 45^{mm}; breadth, 35^{mm}; length of spire, 18^{mm}; length of aperture, 37^{mm}; its breadth, 18^{mm}; length of operculum, 19^{mm}; breadth, 14^{mm}.

Station 2098, N. lat. 37° 40′ 30″, W. long. 70° 37′ 30″, in 2221 fathoms, one living specimen (No. 35,273), and station 2105, N. lat. 37° 50″, W. long. 73° 03′ 50″, in 1395 fathoms, one dead specimen (No. 35,364).

Trichotropis inflata Friele.

Catalog norweg. Nordmeer-exp. Spitzbergen gefund. Mollusken, p. 275, 1879.

Shell small, ovate, with the last whorl large and somewhat ventricose, spire small, turreted, with a rather acute apex and a strongly

marked, somewhat impressed suture. Whorls four, increasing rapidly, rising abruptly from the suture to the strongly convex shoulder, and somewhat flattened at the periphery. The apical whorl is not very small, but rather prominent. The body-whorl forms much the larger part of the shell, and is rather evenly rounded in the middle, strongly produced anteriorly, and narrowed gradually to the tip of the short canal. The sculpture consists of very thin, raised, rather close and regularly spaced revolving cinguli, of which there are about twelve on the penultimate whorl; on one specimen one of these is a little more prominent than the rest. Fine, close, regular, and distinctly raised flexuous lines of growth also cover the whole surface of the lower whorls, crossing both the cinguli and their interstices, but most distinctly the latter; these lines of growth are much finer and more numerous than the cinguli; the two upper whorls are smooth. Aperture somewhat crescent-shaped, not very broad, pretty evenly rounded on the outside, prolonged anteriorly into a short rudimentary canal, and with the inner margin rather flexuous, the columella-margin being straight or a little convex in the middle, while there is a marked excurvature in the umbilical region; the lip is thin, simple, but striated within by revolving lines which show through. The canal is not differentiated from the aperture by any constriction, and ends in a simple and slightly prominent notch; the columella-lip is reflexed over the umbilicus, nearly concealing it in a front view. The umbilicus seen in an end view is narrow and deep.

Length, 6^{mm}; breadth, $3{\cdot}8^{mm}$; length of body-whorl, 5^{mm}; length of aperture, $3{\cdot}5^{mm}$; its breadth, $1{\cdot}8^{mm}$.

Station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms. Two living specimens (No. 38,077).

The original specimens described by Friele were from 223 and 656 fathoms, and from 650 fathoms, off Tromso.

This shell agrees closely with the description and figure quoted. It seems to me very doubtful whether it really belongs to the genus *Trichotropis*. It may prove to belong to *Admete*.

Cingula brychia Verrill, sp. nov.

Plate XXXII, figure 9.

Shell brown, small, rather thick, short and stout, composed of about three rapidly increasing whorls, which are crossed by strong transverse ribs, but are destitute of spiral lines. The apical whorl is relatively rather large, regularly rounded, making a small, obtuse

tip. The second whorl is crossed by about twelve rather prominent and obtuse ribs, which are most elevated at the periphery; their interspaces are concave and wider than the ribs. On the last whorl, which forms the greater part of the shell, there are about fourteen ribs, most prominent on the shoulder, fading out a short distance below the periphery, and also disappearing close to the suture; the base is somewhat produced and is destitute of sculpture. There is a minute umbilical chink or groove, partially concealed by the edge of the lip. The suture is strongly impressed. Aperture rather large, obovate, broadly rounded posteriorly, narrowing nearly to a point anteriorly, at the junction of the outer lip and columella; the outer lip is rather thin, without a varix, strongly convex at the shoulder, and a little produced anteriorly, where it forms a distinct, prominent angle at its junction with the columella-margin, which is straighter than in most species, though somewhat excurved. In some specimens there appears to be a rudimentary notch at the anterior angle of the lip, somewhat like that of *Trichotropis* and *Litiopa*. The inner lip is usually not continuous on the body-whorl. Color dark reddish brown, varying to light brown and brownish yellow, frequently more or less coated with iron oxide.

Length, 2·3^{mm}; breadth, 2^{mm}; length of aperture, 1^{mm}.

Station 892, in 487 fathoms (No. 38,021), 1880; five living, one dead, station 1093 (No. 38,086), in 349 fathoms, 1882; dredged by the steamer Fish Hawk.

Stations 2072 (No. 38,089); 2076 (No. 38,073); 2078 (No. 38,074); and 2084 (No. 38,099), in 499 to 1290 fathoms, 1883, steamer Albatross.

In color and general appearance this species resembles the young of *C. Jan-Mayeni*. It is, however, a shorter and stouter species, and is destitute of the spiral lines, which render the ribs on the shoulder conspicuously nodulous in the latter.

Cingula syngenes Verrill, sp. nov.

PLATE XXXII, FIGURE 11.

Shell small, white, long-ovate, with a regularly tapering, blunt-tipped spire; a strongly impressed suture; and four to five evenly convex whorls, which are rather finely and regularly reticulated by transverse ribs and revolving cinguli of nearly equal strength, except on the base, which has only the spiral sculpture. Apical whorl relatively large, obtusely rounded, nearly smooth; on the second turn a

few revolving lines appear; the lower whorls are crossed by about fourteen to sixteen, regular, rather elevated, but not broad, rounded ribs, which are nearly straight and separated by pretty regular interspaces, usually about twice as broad as the ribs. On all except the last whorl, the ribs extend from suture to suture; on the last whorl they fade out a little below the periphery. The whole shell, except the nucleus, is covered with well developed, rather thin, revolving cinguli, which are about the same height as the ribs, though rather thinner, but in crossing the ribs they do not form nodules, so that the surface is cancellated with a regular net-work, of which the meshes are squarish, or elongated in the direction of the revolving lines, but below the periphery of the last whorl the cinguli become stronger and the ribs fainter, while the greater part of the base is occupied with cinguli only, which are here rather closely crowded. On the penultimate whorl there are about six or seven cinguli; on the body-whorl there are sixteen to nineteen, of which eight or nine are posterior to the lip, and six or seven anterior to it. The surface is also marked with very fine revolving striæ, visible under the microscope. Umbilicus none. Aperture rounded or very broadly ovate, usually slightly narrowed and obtusely angled posteriorly; broadly rounded and slightly flaring in front; outer lip sometimes thin and sharp, sometimes distinctly thickened, but without a varix; anteriorly it is slightly effuse, and sometimes forms there a faint rounded angle; the inner lip is continuous, forming a regular curve, but not quite so convex as the outer margin; the portion in contact with the body-whorl has a free edge, and in the umbilical region the margin is a little reflexed, often leaving a slight furrow beneath it.

Length, 3^{mm}; breadth, $1{\cdot}6^{mm}$; length of aperture, $1{\cdot}2^{mm}$; its breadth, $\cdot8^{mm}$. Other specimens are somewhat more slender than the one measured.

Station 2109, in 142 fathoms, off Cape Hatteras, N. lat. 35° 14′ 20″, W. long. 74° 59′ 10″. Several specimens, living and dead (No. 35,453).

This species belongs to the same group as *C. arenaria*, *C. carinata*, and *C. areolata* of our northern coasts. From all these it differs in having a finer and more regular sculpture, both the ribs and revolving lines being much more numerous and more regular. Nor do either of the northern species possess the microscopic striæ. In this last character it resembles *C. harpa* and *C. leptalea;* but *C. harpa* is a stouter shell, with much finer and more numerous revolving lines, which do not give it a cancellated appearance. *C. leptalea* is

entirely destitute of the transverse ribs. The present species also resembles *C. abyssicola* of northern Europe, as figured by G. O. Sars, but the latter has a stronger sculpture, with fewer revolving lines, and the outer lip has a distinct varix. *C. Jeffreysi* differs in nearly the same manner.

Cingula leptalea Verrill, sp. nov.

PLATE XXXII, FIGURE 10.

Shell of moderate size, thin, slender, composed of four very convex whorls separated by a deep suture, and with small spiral cinguli and microscopic, wavy, revolving lines. The apical whorl is rather large, smooth, regularly coiled, forming a small rounded apex. The lower whorls are covered with small, rounded cinguli, of which there are from eight to ten above the suture, on the penultimate whorl, those just below the suture becoming indistinct; on the body-whorl there are about twenty; they are separated by concave interspaces of somewhat greater width, the spaces becoming greater on the upper part of the whorl. Both the interspaces and cinguli are covered by very delicate, microscopic, raised lines, which are bent into minute, close waves, giving the whole surface a microscopically vermiculated appearance; of these wavy lines there are mostly from four to six in the interspaces and four or five on the cinguli. The whorls are crossed by raised lines of growth, which in some places are pretty regular and nearly as prominent as the cinguli, which they cross so as to produce a finely reticulated sculpture; this is seen most frequently near the shoulder, but is not constant, often fading out both near the suture and anteriorly. There are also more or less distinct microscopic lines of growth which cross the minute revolving lines, but are less distinct than the latter. The aperture is rather large, regularly ovate; the outer lip is a little thickened, but without a varix; it is regularly arched exteriorly and a little effuse in front; the inner lip is well developed and continuous, though closely adherent to the body-whorl. There is no umbilicus, but a small chink is formed by the eversion of the columella-lip. Color, in alcohol, pale yellowish white with a tinge of greenish, and translucent; when dry, white and opaque.

Length, 3^{mm}; breadth, $1{\cdot}8^{mm}$; length of aperture, 1^{mm}.

Station 2072, N. lat. 41° 53′, W. long. 65° 35′, in 858 fathoms (No. 38,060). One living specimen.

This species is easily distinguished by the peculiar, elegant, spiral microscopic lines, combined with the numerous spiral cinguli, visible under a lens. There are no regular transverse ribs.

Cingula apicina Verrill, sp. nov.

PLATE XXXII, FIGURE 8.

Shell conical, rapidly tapering to a very acute, sub-stiliform tip. Nuclear whorls about four, smooth, dark brown; the first is minute and obliquely incurved; the others very gradually increase, so as to form a slender, somewhat stiliform nucleus, below which the normal whorls increase much more rapidly. The normal whorls, of which there are five, are very convex, evenly rounded, with a strongly impressed suture, and everywhere crossed by fine, distinct, obliquely raised, slightly flexuous lines of growth, some of which often appear as distinct riblets, but without any distinct spiral lines. Aperture nearly round, faintly angulated, a little in advance of the middle, by a very slight and rather indistinct ridge, which surrounds the base near the periphery. Columella-margin thin and somewhat reflexed over the umbilical depression; inner lip short, formed by a thin layer of enamel closely adherent to the body-whorl. Umbilicus small and deep, partially concealed in a front view by the reflexed edge of the lip, but distinctly visible in an end view. Epidermis thin, closely adherent, light horn-color, without much luster, and having a distinctly fibrous appearance, under a lens. Shell grayish white. Operculum nearly round, very thin, pale horn-color, with very indistinct subspiral lines of growth.

Length, 7·6^{mm}; breadth, 5^{mm}; length of body-whorl and canal, 5^{mm}; length of aperture, 2·5^{mm}; its breadth, 2^{mm}.

Station 2041, N. lat. 39° 22′ 50″, W. long. 68° 25′, in 1608 fathoms. Steamer. Albatross, 1883 (No. 38,070).

A single living specimen of this species was obtained. The animal, in alcohol, has rather short, stout, tapering tentacles, and is apparently without eyes. Its generic affinities are doubtful. It has some resemblance in sculpture and appearance to *Lacuna glacialis*, but the latter is a stouter shell, with a less distinct umbilicus, and without the peculiar stiliform nucleus seen in the present species. In the last character it approaches *Litiopa*, but it has not the notch, or rudimentary canal, characteristic of that genus.

Cithna tenella, var. costulata Jeff.

Lacuna tenella Jeffreys, Brit. Conch., p. 204, pl. 101, fig. 7.
Cithna tenella, var. *costulata* Jeffreys, Proc. Zool. Soc. London, 1883, p. 110.

This species was taken at station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms (No. 38,069). One living specimen.

It has been taken on the European coasts at several localities, in 114 to 2050 fathoms, from off the Faroe Islands to the Azores and Mediterranean. It was taken off Pernambuco, Brazil, and east of Japan by the Challenger (Jeffreys). It occurs in the Pliocene of Sicily and Calabria, according to Jeffreys.

Cithna cingulata Verrill, sp. nov.

Plate XXXII, figure 7.

Shell small, rather solid, depressed, with a low spire, and angulated, spirally striated whorls. Base broad, convex; umbilicus small and deep. The nucleus is relatively large, nearly smooth, glossy, deep chestnut-brown, composed of about three rapidly increasing whorls, the last of which is finely spirally striated; the apical whorl is minute and regularly coiled, not prominent; the change from the nucleus to the normal whorls is abrupt. Aside from the nucleus, there is rather more than one whorl, which increases rapidly and constitutes the bulk of the shell; this whorl is very convex at the periphery and more or less distinctly bicarinate; one carina surrounds the periphery; the other at a short distance above this forms a slight, rather indistinct shoulder; the band between the upper carina and the suture is slightly convex and joins the preceding whorl nearly at right angles, bending inward at the suture so as to form a narrow and rather deep sutural groove. The whole surface, below the nucleus, both above and below, is covered by numerous, pretty regular, close, spiral cinguli, separated by grooves of about the same breadth on the periphery, but more crowded on the base; the surface is also roughened by fine and minute lines of growth. On the last whorl there are four or five cinguli between the carinæ. The umbilicus is regular, somewhat funnel-shaped, narrow and deep. The aperture is rather large, roundish, with the anterior and inner borders slightly patulous, and the outer border expanded and more or less angulated at the carinæ; the inner lip is continuous, with a distinct edge along the narrow part, which is attached to the pillar. Columella-margin somewhat flat-

tened and a little effuse anteriorly. Color white, below the brown nucleus.

Height, 2·2^{mm}; breadth, 3·6^{mm}; breadth of aperture, 2^{mm}.

A young specimen, preserved in alcohol, and apparently of the same species, has a distinct epidermis, bearing small hair-like processes, most prominent on the carinæ. Its nucleus is somewhat smaller than in the specimen described above, but has the same form and color.

Station 2076, N. lat. 41° 13′, W. long. 66° 00′ 50″, in 906 fathoms (No. 38,101); station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms (No. 38,105). The young alcoholic specimen referred to is from station 2043, in 1467 fathoms, N. lat. 39° 49′, W. long. 68° 28′ 30″ (No. 38,104). Albatross, 1883. One specimen was taken at each locality.

Cithna (?) olivacea Verrill, sp. nov.

PLATE XXIX, FIGURE 5.

Shell thin, translucent, naticoid, as broad as high, subglobular, with about four rapidly expanding, rounded whorls. Suture distinct, scarcely impressed. Surface smooth, glossy, covered with a greenish yellow, thin, closely adherent epidermis. The upper whorls are obscured by a thin, smooth, chitinous deposit, which also fills the suture; beneath this the nuclear whorls appear to have a delicate sculpture, consisting of two or more revolving cinguli crossed by delicate lines of growth. Aperture very broad, ovate; the outer lip is evenly rounded, forming nearly a semicircle. Columella-lip nearly straight, a little excurved in the middle, with the edge everted and a little thickened, slightly effuse, and forming a distinct, rounded angle and a rudimentary notch, where it joins the outer lip. The inner lip is continued from the columella-margin to the outer lip by a very thin smooth deposit of enamel, without a free edge. Spire very short, apex obtuse. Umbilicus wanting.

Length, 4^{mm}; breadth, 4^{mm}; length of aperture, 2·25^{mm}; breadth, 2^{mm}.

Off Martha's Vineyard, station 1154, in 193 fathoms, 1882. An additional specimen from station 2084, in 1290 fathoms, 1883.

Both specimens were without the animal, though fresh in appearance. The affinities of this shell are, therefore, very doubtful.

Family SEGUENZIDÆ.

The beautiful deep-sea shells included in the genus *Seguenzia*, with the closely allied forms (*Basilissa*, etc.), present several remarkable characters which ought, certainly, to entitle them to rank as a distinct family.

The shell is trochiform, with elegant revolving and transverse raised sculpture, and usually translucent, with more or less pearly luster, when fresh. Umbilicus open or closed. Aperture irregular, usually with a marked posterior sinus, a short or rudimentary canal, or anterior sinus, and sometimes with two anterior sinuses. Operculum thin, rounded-ovate or ear-shaped, with a subcentral nucleus and fine concentric lines. Jaws ovate, with tesselated surface and denticulated edge. Odontophore (in *Seguenzia*) minute, *Tænioglossate;* the central tooth small, with one denticle; the inner laterals smaller, with curved unarmed tip; the two outer laterals slender, sharp, strongly curved.

By Jeffreys this group was placed near *Solarium* (Ptenoglossa); by Watson in the *Trochidæ* (Rhiphidoglossa).

It has really no affinity with either of those groups, but belongs to the *Tænioglossa.* It seems more nearly related to *Aporrhais* and allied forms, than to any of our other shallow water groups.

Seguenzia formosa Jeffreys.

Jeffreys, Proc. Roy. Soc. London, vol. xxv, pp. 200, 201, 1876 (wood-cuts); Ann. Mag. Nat. Hist., p. 319, April, 1876.

Boog Watson, Mollusca Challenger Exp., Part III, Journ. Linn. Soc., vol. xiv, p. 587, 1879.

Plate XXXI, figures 14, 14*a*, 14*b*.

Several living specimens were dredged by the Albatross in 1883, in 1290 to 2033 fathoms. Station 2037, N. lat. 38° 53′, W. long. 69° 23′ 30″, in 1731 fathoms, one young specimen (No. 38,232); station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms, two living specimens (No. 38,078); station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms, two living specimens (No. 38,247).

These specimens show some variation in sculpture and in the presence or absence of a small umbilical perforation or channel.

In the typical form of *formosa* the body-whorl is surrounded by three principal carinæ, which are prominent and rather sharp. One of these, around the periphery, is coincident with the posterior angle of the aperture, and, therefore, with the suture, which it usually con-

ceals; both above and below this, at about equal distances, there is another less prominent carina, the lower one defining the basal area; the upper one is about midway between the median carina and the suture. The intervals between these carinæ are broadly concave and crossed by numerous pretty regularly spaced, thin, raised and curved riblets; those between the upper carina and the suture have their concave side toward the aperture and terminate posteriorly in a small, slightly prominent lobe or crest in crossing the sutural carina; those in the two peripheral zones have their convex side toward the aperture and do not cross the carinæ. On the base there are about seven to nine rather prominent revolving cinguli, besides the carina already referred to; the intervals between these are concave and variable in width, and are crossed by numerous, small, oblique riblets. The surface of the whorls between the riblets is covered by fine revolving lines, visible with a lens. The umbilicus is represented only by a narrow spiral groove or channel, nearly concealed by the strongly recurved or reflected margin of the columella-lip, and bounded outwardly by a spiral ridge. The aperture is rather large and angulated, or lobed, with a deep, rather broad posterior sinus, which is deepest just above the upper carina, where the corresponding riblets are most strongly excurved; below this the outer lip is thin, and bends outward and inward, corresponding to the external carinæ and their interspaces; below the periphery and opposite the most convex part of the base the outer lip bends outward and shows another shallow sinus; there is also a small sinus or rudimentary canal at the junction of the lip with the extremity of the columella, which terminates in a small, somewhat prominent angle. The columella-margin is strongly spirally twisted, much excurved opposite the umbilical region, beyond which it curves strongly forward and outward, forming there a small, prominent, sometimes slender tooth, which is often broken. The operculum is ear-shaped or broad-ovate, with an emargination on one side, thin, translucent, pale yellow, with a very delicate, concentric structure. The nucleus is sub-central; around it are numerous thin, close, concentric lines, most distinct about midway between the center and margin; the outer part is transparent and shows no distinct lines; the muscular attachment is ovate, not very large, and excentric to the center.

Jaws thin, brown, irregularly ovate, the outer half covered with small tesselated elevations, becoming more prominent, blunt or spatuate at the margin.

Odontophore very small and slender; median tooth minute, thin, with the tip bent forward and ending in a minute central denticle; inner laterals, with the tip small, curved forward, flat, unarmed, almost half as wide as the median; outer laterals long, slender, very acute, strongly curved.

Length of the largest specimen, 5^{mm}; breadth, 4^{mm}; breadth of aperture, 2^{mm}.

At station 2084, two younger specimens were obtained. These, while agreeing with the larger specimens in form and sculpture, have a narrow but deep umbilical perforation, which is only partially concealed by the reflexed columella-margin. One specimen has five, the other six spiral carinæ on the base. The columella-margin is thin and shows only a small tooth at its extremity. The nucleus, as in the typical form, is small, smooth, turned up obliquely, and somewhat prominent. The presence of the umbilical perforation seems to be due only to immaturity.

Seguenzia formosa, var. **nitida** Verrill, nov.

This shell agrees nearly in form and size with typical *S. formosa*, but is thinner, more translucent, with the spire a little less acute, and with more delicate sculpture. It differs chiefly in having more numerous and closer spiral lines on the base, the number below the median carina of the whorl being ten to twelve, the intervals between them diminishing as they approach the umbilical region. Our specimens have a narrow, spirally twisted, deep umbilical perforation and channel, mostly concealed in a front view by the reflexed edge of the columella-lip; the umbilical pore is bordered externally by the innermost spiral ridge. The columella is much excurved at base, strongly spirally twisted, and projects at the end in a somewhat prominent, excurved angle, forming a small canal, but has no distinct tooth on the inner margin like that seen in the typical *S. formosa*, but this may be due to injury; the outer lip is more regularly convex and has a less developed posterior sinus. The two principal carinæ on the whorls are elevated and rather prominent, with the edge a little thickened, often obtuse and finely spirally lined, not interrupted by the transverse riblets, which fade out at a little distance below the crest, except on the sutural carina, which they cross. The riblets are rather thinner, more delicate, and more numerous than in the typical *S. formosa*, and are less elevated. They are also more strongly curved and decidedly closer together, especially those between the two peripheral carinæ. There is, also,

in some cases, a distinct, subsutural raised line. The fine spiral lines between the carinæ are rather more regular and distinct than in the typical form. The nuclear whorl is a little prominent and turned up, rounded, smooth, glossy, and rather larger than in the latter.

Length, 5^{mm}; breadth, 4^{mm}; length of aperture, 2·3^{mm}; its breadth, 2^{mm}.

Station 2038, in 2033 fathoms, with *S. formosa*, three living examples (No. 38,078).

Seguenzia eritima Verrill, sp. nov.

Plate XXXI, figure 15.

Shell thin, delicate, stout-conical, with a rather high, regularly tapered, acute spire, a narrow, deep umbilical pore, and a somewhat produced base, which is sculptured by numerous (15 to 20) small, spiral cinguli.

Whorls seven, rapidly increasing, strongly angulated and carinated in the middle. Suture distinct, very slightly impressed, bordered below by a small, slightly raised, spiral ridge; from this the wide subsutural band rises, at an abrupt angle, to the carina of the shoulder, forming a flat or somewhat concave upper slope on the whorls. On the spire the shoulder is situated at about the middle of the whorls, and the periphery, below the carina, is flattened and descends nearly perpendicularly to the suture. On the last whorl a second sharp carina surrounds the periphery, the space between the two being a little greater than that above the first carina, the peripheral band being here somewhat concave. Below the peripheral carina the base is covered by fifteen to twenty smaller and distinctly raised, thin cinguli, of which the two or three outermost are but little smaller than the carinæ, and separated by spaces two or three times their own breadth; near the umbilicus the spirals again become a little stronger and wider apart, while over the greater part of the base they are slender and very close set, the grooves between being scarcely as wide as the lines; midway between the center and circumference there is a low, ill-defined spiral ridge, corresponding to the anterior sinus of the lip; the innermost spiral line forms a thickened border for the umbilicus. The spaces between the carinæ are crossed by numerous, very delicate, flexuous, raised riblets, which are close and very regularly spaced, and rather more prominent on the last whorl than on the spire; those on the subsutural

band, which are closer together than the others, are excurved in the middle, bending abruptly forward to join the shoulder-carina, which they do not cross, nor do they form prominences on the sutural carina; those of the peripheral band curve in the opposite direction, their convex side being toward the aperture. In the narrower spaces between the outer basal cinguli similar riblets are also present, but are here oblique, finer, and less distinct; the spaces between the carinæ are also marked by fine, raised spiral lines, visible with a lens, which do not interrupt the riblets; often some of these, near the median carina, are larger than the rest. The apical whorl is a little prominent, small, regular, smooth and glassy. The suture often appears slightly channeled, when the sutural carina is a little removed from it, owing to the fact that the peripheral carina of the previous whorl is nearly coincident with the suture. The carina defining the shoulder often appears double or grooved at its summit, on the last whorl. The umbilicus is narrow, but deep and spirally twisted, being more or less encroached upon by the incurved columella-edge. The aperture is irregularly angulated and somewhat three-lobed, with two distinct, somewhat produced, narrow sinuses in front; a deep, rather wide notch or posterior sinus corresponding to the subsutural band; and a strongly excavated, rounded sinus at the base of the columella. The outer lip is thin, sharp, angulated at the terminations of the carinæ, and projects strongly forward at the periphery and bends outward in the form of two very short, rather narrow, rounded canals anteriorly. These are nearly equal in size, the outermost corresponding to a slight convex ridge on the outer part of the base, the inner one corresponding to the termination of the columella-margin; the latter projects forward as a rudimentary canal. The columella-margin is short, somewhat thickened, very strongly spirally curved, and much excurved near its junction with the body-whorl, opposite the umbilicus, beyond which it bears a small, slightly prominent, obtuse tooth. Color translucent white, with a pearly luster or iridescence in fresh specimens. Operculum thin, pale yellowish horn-color.

Length, 4·5^{mm}; breadth, 3^{mm}; length of body-whorl and aperture, 3^{mm}; breadth of aperture, 1·7^{mm}.

One living specimen from station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms (No. 38,092), the figured type; four specimens from station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms (No. 38,249), one living; station 2043, in 1467 fathoms, one dead (No. 38,269).

In size, form, and the general character of the sculpture this species resembles *S. formosa* J., from which it differs mainly in the more delicate character of the sculpture, less acute carinæ, finer and closer riblets, and much more numerous and finer lines on the base. The typical form of *S. formosa* is destitute of an umbilicus, although a narrow one appears in some of the small specimens. This species seems to be a thinner and more delicate shell than any of the varieties of *S. formosa*, and has a more convex base and a smaller nucleus, but a less acute spire. From *S. carinata* Jeff. and *S. ionica* Watson it differs in having a higher and more acute spire, and decidedly in the sculpture and the narrowness of the umbilicus, which in this form is a deep, narrow, spiral perforation. I have seen no description of *S. elegans* Jeff., other than the statement that it is umbilicated.

Piliscus commodus (Middendorff.)

Pilidium commodum Middendorff, Beit. Malacozoologia Rossica, pl. 17, figs. 4–11, 1847.

? Pilidium radiatum M. Sars; G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 144, pl. 8, figs. 6, *a–d*, pl. v, figs. 1, *a*, *b* (dentition).

Pilidium commodum Friele, Nyt. Mag. Naturvid., xxiii, 1877, [sep. copy, p. 2], pl., figs. 2, 2*a*, dentition.

Shell very thin, translucent, bonnet-shaped, with the anterior slope rising gradually to the apex, which recurves and overhangs the posterior margin. Aperture very large, broad-ovate, a little narrowed posteriorly, broadly rounded in front. Apex prominent, situated near the posterior end, curved backward and inward, and twisted obliquely to the right; the extreme apex is rather large, bluntly rounded, incurved, and appressed against the body of the shell posteriorly; this nuclear portion expands at first only gradually, and appears to be minutely punctate under a lens. The body of the shell is covered with rather conspicuous, close, raised lines of growth, but is destitute of any radiating lines. The whole surface, except the apex, is covered with a thin, fibrous, concentrically corrugated, yellowish white epidermis, which easily peels off when dried. Margin very thin and sharp, flaring, especially in front. Internally the cavity of the shell corresponds closely with the exterior form, the apical portion running up into the nucleus of the shell and becoming subspiral. Muscular scars very indistinct. Posterior slope abrupt, almost perpendicular, and somewhat concave in a side view, and overarched by the projecting apex, which is situated rather to the

left of the central line, so that the shell is a little one-sided, with the lateral slope on the right side longer and more gently sloping than on the left.

Length of shell, across aperture, 20^{mm}; greatest breadth, 18^{mm}; height, 9^{mm}; front margin to apex, 20^{mm}.

The animal resembles that of *Capulus Hungaricus*, but the muscle by which it is united to the shell is far less developed. The tentacles are large, stout, blunt, with well developed eyes on a basal swelling. There are two large plumose gills situated in a large cervical cavity and attached on the left side, but extending entirely across the back of the neck, so that the tip of the larger gill is visible back of the right tentacle. The foot is rather small, in the alcoholic specimen, and has the anterior corners produced into short obtuse auricles. The dorsal part of the animal is moderately convex and does not show, in the preserved specimen, a subspiral form corresponding to that of the shell. The apical portion contains a large cluster of ova, which is distinctly visible through the integument.

Station 2062, near Le Have Bank, off N. S., on rocky bottom in 150 fathoms. One living specimen (No. 35,274). It was associated with *Primnoa reseda* and other arctic forms.

This species has not been previously recorded as living in the North Atlantic, south of Iceland, unless *P. radiatum* Sars, from West Finmark, be a variety of it. It was originally described from Okhotsk. Friele records it from off Iceland, in 290 fathoms. It occurs in the post-pliocene at Uddevalla, and in the Coralline Crag of England (as *Capulus fallax* S. Wood, t. Jeffreys).

GYMNOGLOSSA.

Eulimella lucida Verrill, sp. nov.

PLATE XXXII, FIGURES 3, 3*a*.

Shell rather large for the genus, long and slender, with a tall, regularly tapered, acute spire, composed of about eleven whorls besides the nucleus, which is small, prominent and strongly upturned.

The whorls are much flattened and but little convex. The suture is distinct, but scarcely at all impressed, especially on the upper half of the spire, and not very oblique. The surface is everywhere very smooth and polished, with a very brilliant luster, without any sculpture whatever, and with exceedingly indistinct lines of growth. The aperture is almost regularly ovate, narrowed posteriorly, where

it ends in a slight sutural notch; anteriorly it is evenly and obtusely rounded. The outer lip is sharp, evenly arched, and projects considerably forward in the middle; in front it is somewhat produced and flaring, but passes into the columella-lip in a regular curve; the columella-lip is regularly excurved, with the outer margin somewhat everted. There is no umbilicus. Color translucent pinkish white.

Length, 8^{mm}; breadth, 2·3^{mm}.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms. One living specimen.

This species is closely related to *E. charissa*, but it is larger and stouter, with a decidedly larger nucleus, and with more flattened whorls and a less distinct suture, and it has a smaller number of whorls in the same length. It is remarkable for its smoothness and brilliant polish, in this respect resembling *Eulima*.

Eulimella charissa Verrill, sp. nov.

PLATE XXXII, FIGURES 4, 4*a*, 4*b*.

Shell small and delicate, translucent white, very slender, with the spire attenuated toward the upper end and very acute, composed of about eleven whorls.

The apical whorl is very small, strongly upturned and reversed; the succeeding whorl is scarcely larger. The suture is slightly but distinctly impressed and not very oblique. The whorls are moderately convex in the middle, though somewhat flattened. The surface is nearly smooth and brilliantly polished, without sculpture, except fine, microscopic, and rather indistinct, flexuous lines of growth, usually most evident close to the suture. Aperture ovate, narrowed to a point posteriorly, where it terminates in a shallow, sutural notch; the outer lip is moderately and regularly convex, projecting forward in the middle, slightly produced and a little flaring in front; it blends with the columella-lip in a regular curve; the columella-margin is regularly excurved, and forms a sinuous curve with the edge of the body-whorl. No umbilicus. Color translucent white, sometimes with a tinge of pinkish.

Length, 5·6^{mm}; breadth, 1·8^{mm}. Other specimens are somewhat more slender than the one measured.

Station 2038, in 2033 fathoms, with the preceding species. Four specimens, three of them living.

This species is very similar to the preceding, but is distinguished by its smaller size and much more slender spire, having a greater

number of whorls in the same length, and by the smaller apical whorl. The whorls are also somewhat more convex and the suture more impressed. In one specimen the spire is somewhat crooked.

Eulimella nitida Verrill, sp. nov.

PLATE XXXII, FIGURE 5.

Shell smooth, polished, rather large for the genus, moderately elongated, with a tall, regularly tapering spire, of more than eight whorls (apex broken), separated by a well defined, somewhat impressed, rather oblique suture.

Whorls moderately and regularly convex. Last whorl much larger than the preceding ones, with the base produced. Aperture long-ovate, much narrowed posteriorly, and terminating in a narrow, rather deep sutural notch, regularly arched and somewhat flaring anteriorly; outer lip thin, sharp, receding in a rather deep notch where it joins the previous whorl, from which it projects forward in a rather strong regular curve, most prominent in the middle, from whence it recedes again anteriorly to the front margin, which is somewhat produced and distinctly effuse. The columella-margin is somewhat excurved, and joins the anterior margin without forming an angle. There is no umbilicus. The surface is everywhere smooth and polished, showing only very faint and indistinct lines of growth. The sutural line often appears double, owing to the inner edge of the suture showing through the translucent shell.

Length of the specimen, lacking the nuclear whorls, $6{\cdot}5^{mm}$; breadth, 2^{mm}.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms. One specimen.

This species appears to be closely related to *E. lucida*, though the absence of the nucleus prevents a close comparison. It differs in the greater convexity of the whorls, in the more oblique and more impressed suture, the longer body-whorl, more produced anteriorly, and the narrower and more elongated aperture, which is more effuse anteriorly. From *E. charissa* it differs still more decidedly in most of these characters, and the latter is also a smaller and much more slender species, with more numerous whorls.

Eulimella (or **Menestho**) **lissa** Verrill, sp. nov.

PLATE XXXII, FIGURE 6.

Shell small, white, polished and somewhat lustrous, slender, somewhat obelisk-shaped, composed of about eight flattened whorls, without any sculpture. Apical whorl very small, abruptly upturned, its diameter only about half that of the next whorl.

The succeeding whorls increase rapidly at first, but the later ones less rapidly, so that the shell has a somewhat Pupa-like form. The whorls are only slightly convex in the middle, but the suture is distinctly impressed. The aperture is irregular ovate, acutely angled posteriorly, broadly rounded anteriorly, with the inner margin sinuous and pretty strongly emarginate at the base of the columella. The outer lip is thin and sharp, only moderately convex in the middle, and projecting only slightly or not at all, there being no distinct sutural notch; anterior margin evenly rounded, only very slightly effuse, sometimes slightly flaring, at other times not at all so; columella-margin regularly excurved, passing into the anterior margin without forming an angle, its outer edge usually everted; the inner lip, at the junction of the columella-margin with the body-whorl, sometimes has a perceptible emargination, but in other examples a strongly excurved outline. The base of the shell is only moderately produced, without any sculpture, nor any trace of an umbilicus.

Length, 6^{mm}; breadth, $1{\cdot}8^{mm}$; length of body-whorl, $2{\cdot}8^{mm}$; length of aperture, $1{\cdot}2^{mm}$.

Station 2109, off Cape Hatteras, in 142 fathoms (No. 35,433), numerous specimens, living and dead. Steamer Albatross, 1883.

This species has the general appearance of certain species of *Odostomia*, but there is no trace of a tooth on the inner margin. It is remarkable for the small size of the apical, as compared with the succeeding whorls, and also for its pupiform or obelisk-shaped outline. In these characters it differs from the species of *Eulimella* herein described, and from those previously discovered on our coast. The aperture, also, is smaller than in most of the related species, and the outer lip projects less distinctly forward. It resembles in form species of *Menestho*, but has no spiral grooves. It seems to have been very abundant at the locality where these specimens were taken.

Odostomia tornata Verrill, sp. nov.

Shell small, conical, consisting of about six whorls, which are flattened and taper regularly to a very acute apex. Each whorl is surrounded by two very strongly marked, broad, revolving grooves, with nearly perpendicular edges; one of these is situated just above the suture; the other, which is somewhat broader, surrounds the middle of the whorl; the two are separated by a raised, flattened revolving band, about as wide as the grooves; a similar but somewhat wider raised band intervenes between the upper groove and the suture, which is not impressed and not very distinct, as it lies at the edge of the groove. The apical whorl is very minute and upturned.

The base of the shell is somewhat produced and nearly smooth. Aperture irregularly ovate, acute above, broadly rounded and flaring anteriorly. The outer lip is flattened laterally and a little produced and effuse anteriorly, forming a rounded angle where it joins the columella, which has a somewhat reflexed, nearly straight, outer margin. The inner lip has a strong, prominent, acute tooth or fold at the junction of the columella with the body-whorl. There is a narrow umbilical chink, somewhat concealed by the everted margin of the columella.

Length, 3^{mm}; breadth, $1{\cdot}5^{mm}$; length of aperture, 1^{mm}.

Station 2109, in 142 fathoms, off Cape Hatteras, 1883. One specimen.

This species is remarkable for the size and depth of the two revolving furrows.

Odostomia disparilis Verrill, sp. nov.

Shell elongated, slender, regularly tapering to an acute tip. Whorls about seven, moderately convex, or a little flattened in the middle. The whorls of the spire with both longitudinal ribs and revolving lines, while the last whorl is nearly smooth, having only very faint revolving lines.

Suture conspicuous, decidedly impressed. On the lower whorls of the spire the ribs are prominent, thick, and obtuse, about fourteen to sixteen in number, separated by intervals narrower than their own breadth, and running nearly straight across the breadth of the whorl; the narrow and deep interstices are crossed by numerous fine revolving lines, which are not distinct on the ribs. On the last whorl faint indications of ribs occasionally appear as subsutural crenulations, disappearing a short distance below the suture. Aperture rather

narrow-ovate, much narrowed posteriorly, and terminating in a slight sutural sinus; anteriorly broadly and evenly rounded, without any angle next the columella-margin; lip thin, broadly rounded on the outer margin, evenly rounded anteriorly, passing into the thin columella-margin in a regular curve; the inner lip is continuous, with a free margin along the body-whorl, which is oblique and almost in line with the columella-margin. This margin is interrupted by a small but distinct tooth, about at the middle, just opposite the minute umbilical chink, formed by the reflexed margin of the lip. Apical whorl broken.

Length, 3·2^{mm}; breadth, 1^{mm}; length of aperture, 0·8^{mm}.

Station 2109, in 142 fathoms, off Cape Hatteras, 1883. One specimen.

This is a very slender and delicate species, remarkable for the very sudden change in sculpture on the penultimate whorl. This, however, may not be a constant character of the species, but due to some injury to the single specimen we have had for examination. But in other respects the species is quite unlike any of those hitherto described from our coast. The aperture is remarkable for its evenly arched anterior and inner margins, which, with the free inner margin, gives it the form and appearance of certain species of *Cingula* (some varieties of *C. aculeus*). The presence of a distinct tooth shows, however, that it is undoubtedly a true *Odostomia*. The sculpture on the upper whorls is, however, more like that found in *Turbonilla*.

RHIPHIDOGLOSSA.

Leptothyra induta Watson.

Leptothyra (*induta*, var.) *albida* Dall, Bull. Mus. Comp. Zool., vol. ix, p. 48, 1881.

Several specimens of this species were taken at station 2109, off Cape Hatteras, in 142 fathoms (Nos. 35,369 and 35,385).

These have been identified by direct comparison with West Indian specimens given to me by Mr. Dall, with which they agree in all respects.

Very young specimens, about two millimeters in diameter, have a well developed spiral umbilicus; somewhat larger specimens have only a small perforation; while in all the mature specimens the umbilicus is entirely closed. The specimens recorded by Mr. Dall are from the Gulf of Mexico and West Indies, in 125 to 2805 fathoms.

Cyclostrema cingulatum Verrill, sp. nov.

PLATE XXXII. FIGURE 14.

Shell small, thin, translucent, spirally lined, depressed, with a low spire, an oblique base, a large funnel-shaped umbilicus, and a wide, oblique aperture.

Whorls about three and one-half. The nuclear whorl is smooth, small, rounded, a little prominent and incurved at tip; the next is strongly convex, swelling a little more strongly below the suture, which is decidedly impressed and slightly channeled. The body-whorl is very large, constituting the greater part of the shell, very convex, and more broadly rounded above than beneath, the most convex portion being on the base, below the periphery. The surface of the whorls, except the nucleus, is minutely roughened by fine, close, oblique and somewhat flexuous lines of growth, some of which are a little raised, especially near the suture, where they run obliquely backward, and have an indistinctly fibrous and wavy appearance. The upper whorls have no spiral lines, but the last whorl is surrounded by a number of thin, sharp, distinctly elevated, distant spiral cinguli, the intervals between them being from five to ten times their breadth; the uppermost is at some distance from the suture and there are only about six or seven above the periphery; below the periphery and on the base they become closer together and more numerous, eight to ten being visible in a view of the under surface; on the base the intervals between are mostly four or five times their breadth. The umbilicus is funnel-shaped, rather large and deep, and not defined by any definite border. The aperture is large and very oblique, broad-ovate, somewhat narrowed posteriorly, and broadly and evenly rounded in front; the outer lip is thin and sharp, evenly arched; the pillar-lip is attached only for a short distance to the body-whorl, and shows a thin, free edge. Color translucent grayish white. Animal not known.

Length, 2^{mm}; breadth, $2{\cdot}2^{mm}$; breadth of aperture, $1{\cdot}2^{mm}$.

Station 2048, N. lat. 40° 02′, W. long. 68° 50′ 30″, in 547 fathoms (No. 38,100). One specimen.

This species is remarkable for its very oblique aperture; the wide, funnel-shaped umbilicus, and the peculiar, thread-like spiral lines, which surround the body-whorl and base. Whether it belongs to the genus *Cyclostrema* is somewhat doubtful.

Cyclostrema affine Verrill, sp. nov.

PLATE XXXII, FIGURE 15.

Shell rather large for the genus, with a moderately elevated spire, a prominent, convex base, a narrow umbilical perforation surrounded by spiral lines, and evenly rounded, nearly smooth whorls, separated by a distinctly impressed suture.

The nuclear whorl is moderately large, smooth, chestnut-brown, rounded, slightly prominent, and a little incurved. The succeeding whorls are evenly rounded, increasing rapidly, with a smooth and somewhat glossy surface, and marked by faint lines of growth, and occasionally with a few indistinct spiral lines below the suture, and by numerous thin, raised, and well defined cinguli on the base; the innermost of these, immediately around the umbilicus, are stoutest and most elevated, the size and elevation decreasing outwardly until they disappear, usually about midway between the umbilicus and the periphery; the inner ones are separated by intervals mostly about equal to twice their breadth; the outermost ones are relatively farther apart, while the intermediate ones are usually nearest together; sometimes one or two of those revolving within the umbilical depression are decidedly larger than any of the others, taking the appearance of small carinæ, but the outer ones are always fine and thread-like. The aperture is somewhat oblique, large and nearly round, but slightly flattened or indented opposite the body-whorl and umbilicus; the lip is thin and the inner portion is attached to the body-whorl for only a very short distance, and shows a distinct, free edge. The umbilicus is narrow, spirally twisted and often partially concealed by the margin of the inner lip. Color grayish white, often a little iridescent and somewhat lustrous. Operculum yellowish horn-color.

Length, 2^{mm}; breadth, $2{\cdot}2^{mm}$; breadth of aperture, $1{\cdot}3^{mm}$.

Station 2115, N. lat. 35° 49′ 30″, W. long. 74° 34′ 45″, in 843 fathoms, five living specimens.

This is closely allied to *C. basistriatum* J., and *C. rugulosum* Friele, of the European coasts.

Cyclostrema diaphanum Verrill, sp. nov.

PLATE XXXII, FIGURE 16.

Shell small, depressed, trochiform, thin, translucent, white, with a smooth shining surface, without sculpture except around the small umbilicus, where there are numerous fine, close, spiral lines.

Whorls about three and one-half, very convex and evenly rounded, separated by a deeply impressed suture. The nuclear whorl is very minute and regularly spirally coiled, slightly prominent. The last whorl constitutes the greater part of the shell and is shallow and very evenly rounded. The aperture is oblique and very nearly circular, with only a slight angle posteriorly. The outer lip is a little flaring and projects forward anteriorly. The columella-lip is as regularly curved as the outer margin; the inner lip is in contact with the body-whorl only for a short distance, and shows a distinct, continuous, thin edge. The umbilicus is very small, but deep, being scarcely more than a pore or perforation, and is partially overarched by the edge of the columella-lip. The umbilical area is covered by exceedingly fine, close, impressed lines, of which about twenty to twenty-five may be counted; the outermost being about midway between the center and margin of the base; elsewhere the surface is very smooth and polished, with only faint and indistinct lines of growth, except that in one case a very few fine, microscopic spiral lines were noticed just below the suture.

The operculum is thin, yellowish horn-color, circular, composed of many very narrow turns.

Length, 2·5^{mm}; breadth, 3^{mm}; breadth of aperture, 1·3^{mm}.

Station 2004, N. lat. 37° 19′ 45″, W. long. 74° 26′, in 98 fathoms, 1883.

This species resembles the preceding in form, the small size of the umbilicus, and in having spiral lines around the umbilicus, with the surface elsewhere smooth. It differs, however, in being a thinner, more polished, translucent shell; in having the last whorl projecting more obliquely forward, and especially in the much smaller and more regularly coiled nuclear whorl.

From station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms (No. 35,165), there is a specimen of a similar shell of larger size, which is, perhaps, a distinct species. It has, like the species above described, a minute, regularly coiled nucleus and smooth rounded whorls, separated by an impressed suture, and with a very narrow umbilical perforation, but the spiral lines surrounding it are less numerous, less distinct, and farther apart. The aperture is large and nearly circular, but more distinctly angulated posteriorly.

Length, 3·25^{mm}; breadth somewhat greater.

Ganeza, sp.

A single specimen, referred to this genus, was found adhering to a *Gorgonia*, taken by the Blake, off George's Bank, in 980 fathoms, in 1880.

The shell is small, white, smooth and glossy; the spire is moderately elevated and somewhat obtuse at the apex. Whorls four, very convex, with a deeply impressed suture. The nuclear whorl is small, regularly coiled, and not prominent. The base is somewhat produced and well rounded. There is no umbilicus, but its position is marked by a small depression, or slight groove. The aperture is regularly rounded, except on the side next the body-whorl and umbilical margin, where it is somewhat flattened; the lip is indicated on this side by a closely adherent and thin layer of enamel, which appears to be continuous. Sculpture none, except very fine and indistinct lines of growth.

Length, 2·5^{mm}; breadth, nearly 3^{mm}.

This form might be, with equal propriety, referred to *Cyclostrema*. The distinctions between the latter and *Ganeza* and *Tharsis* seem to me trivial, and no more than specific characters, at most.

Tharsis, sp.

Shell small, white, smooth and lustrous, composed of about three and one-half whorls, which increase very rapidly, the last whorl forming a very large part of the shell. The spire is moderately elevated and the whorls evenly convex, with an impressed suture. The base is considerably produced and convex, and the aperture is oblique. The umbilicus is represented by a small and narrow chink, behind the pillar-lip. Sculpture none, though a faint internal subsutural line is visible, and there are traces of microscopic lines of growth. Aperture broad-ovate, somewhat narrowed and angulated posteriorly, broadly rounded on the outer side, and a little produced and rounded in front. Columella-margin regularly excurved, while the portion that joins the body-whorl is decidedly flattened. The inner lip along the body-whorl is represented by a thin but continuous and closely adherent deposit of enamel, not showing a free edge; the lip anteriorly and on the columella-margin is distinctly thickened.

Length, 2·3^{mm}; breadth, 2^{mm}.

Station 2115, off Cape Hatteras, in 843 fathoms, one specimen (No. 38,244).

This species resembles the preceding in general appearance and in the smooth, polished surface, but it is not so broad in proportion; the aperture is more oblique, and ovate instead of circular, and there is a small umbilical perforation, not found in the other.

Cocculina leptalea Verrill, sp. nov.

PLATE XXXII, FIGURES 20, 20*a*, 20*b*.

Shell small, oblong-ovate, rather high, with a prominent, small compressed, strongly recurved, apex, with the tip small, strongly incurved, in eroded specimens becoming free and overarching, situated at about the posterior third of the shell.

The anterior slope of the shell is decidedly convex and considerably longer than the posterior slope, which is nearly straight, but a little concave beneath the apex; the side-slopes are moderately convex. The sculpture consists of strongly marked, raised, very thin, and pretty regular concentric cinguli, which usually become finer and much closer towards the apex, but continue nearly to the extreme tip in perfect specimens; the intervals on the lower part of the shell are four times as wide as the cinguli, and are crossed by numerous, fine, wavy, radiating lines, much finer and closer than the cinguli, but easily visible with a lens; in crossing the cinguli they become a little thickened and give the margin of the latter a slightly crenulated appearance when viewed from above. In some cases these slight thickenings have the appearance of minute beads strung along the upper margin of the cinguli. The aperture is oblong-ovate, a little narrower anteriorly, with the sides a little compressed, but still somewhat convex, and with the anterior and posterior margins bluntly rounded. The margin is thin, sharp and plain. Color pale yellowish white. Epidermis indistinct.

Length of the largest specimen, 4^{mm}; its breadth, $2{\cdot}8^{mm}$; height, $2{\cdot}5^{mm}$.

Station 2036, N. lat. 38° 52′ 40″, W. long. 69° 24′ 40″, in 1735 fathoms (No. 35,128), one dead; and station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms (No. 38,079), one in wood, living, figured type; and station 2105, N. lat. 37° 50′, W. long. 73° 03′ 50″, in 1395 fathoms (No. 35,371), one living.

At station 2038 a specimen occurred in decayed wood which had been bored by *Xylophaga* or *Teredo*. It was associated with *Cocculina spinigera* Jeff. and *Idas argentea* Jeff.

The animal, in alcohol, has a large rounded foot, a broad head, with small tentacles and a large frontal area, extending back on each side in the form of a wide lobe. The mouth is conspicuous, with a swollen, fleshy lobe on each side, and one in front.

This species somewhat resembles *C. concentrica* Jeff., which occurred, according to Mr. Jeffreys, in the same way, in *Teredo*-bored wood, associated with *C. spinigera* and *Idas argentea*. But *C. concentrica* is both figured and described by Mr. Jeffreys as destitute of radiating lines between the concentric ribs, while in our species the radiating lines are distinctly visible on all parts, even close to the extreme tip; therefore it is probable that they are distinct, though closely related, species.

Cocculina spinigera Jeffreys.

Proc. Zool. Soc. London, p. 393, pl. 44, figs. 1–1*c*, June, 1883.

Shell small, thin, rather depressed, with the outline pretty regularly elliptical; apex moderately elevated, small, acute, curved backward, but not distinctly incurved, unless at the extreme tip, situated at about the posterior third of the shell. The sculpture consists of numerous fine radiating lines, which are more or less obscured by extraneous growths, but appear to bear, each, a row of minute epidermal spines, as described by Mr. Jeffreys. In our specimen, however, the spines are mostly concealed by minute sponges, etc., which cover the whole surface of the shell. The animal appears to resemble closely that of the preceding species.

Station 997, N. lat. 39° 42′, W. long. 71° 32′, in 335 fathoms, 1881, in Teredo-bored wood (Nos. 38,091 and 38,095), fifteen living; station 2115, N. lat. 35° 49′ 30″, W. long. 74° 34′ 45″, in 843 fathoms (No. 38,094), one living specimen, 1883.

This is a somewhat doubtful species. Mr. W. H. Dall, to whom I sent some of my specimens, thought that they might be the young of *C. Beanii* Dall.

Cocculina Dalli Verrill, sp. nov.

Shell moderately elevated, with the front slope long and convex; the apex is small, acute, situated far back, nearly over the posterior margin, and not turned to either side; the posterior slope is abrupt and concave. Aperture broad oblong-elliptical, with the margin sharp and plain, muscular scars distinct. The sculpture consists, on the anterior half, of numerous well-marked but small, raised, radiat-

ing ribs, which are crossed by thin, raised, concentric lines of growth, so as to form a row of small granules or vaulted scales along each rib. Along the sides the ribs are fainter, and posteriorly they are nearly obsolete, while the concentric lines remain distinct. Color grayish white.

Length of aperture, 6^{mm}; breadth, 4·3^{mm}; height, 3^{mm}; length of anterior slope, 6^{mm}.

Station 1096, in 317 fathoms, N. lat. 39° 53′, W. long. 69° 47′, 1882; one specimen (No. 38,081).

This species resembles *C. Beanii* in form, but has very different sculpture.

Cocculina conica Verrill, sp. nov.

Shell very small, thin, translucent, white, rather high, conical, with a very broad-ovate or nearly round base and a prominent, sub-spirally twisted apex, which is turned strongly backward, and obliquely to the left. The sub-spiral apex is relatively rather large, and the extreme tip seems to have been deciduous. The anterior slope of the shell rises at first rather abruptly, and then becomes very convex, forming the central and highest part of the shell, from which it descends a little to the apex; the posterior slope is concave under the overhanging apex, and then descends with a short, abrupt slope to the margin, which extends back but little beyond the apex. The sculpture consists only of rather irregular, concentric raised lines of growth, which run sub-spirally on the upper portion of the shell.

The animal, in alcohol, has a nearly round foot and two small, slender, cylindrical tentacles, and is apparently without eyes.

Length and breadth, about 1^{mm}; height, about the same.

Station 2078, in 499 fathoms, N. lat. 41° 12′ 50″, W. long. 66° 12′ 20″.

Puncturella (Fissurisepta) eritmeta Verrill, sp. nov.

PLATE XXXII, FIGURES 19, 19*a*.

Shell small, thin, delicate, translucent white, glossy, moderately elevated, with the base between elliptical and ovate, somewhat narrowed anteriorly, having both ends evenly rounded and the sides somewhat compressed, but still moderately convex. The apex is minute, nearly central, compressed, turned backward, but scarcely incurved, and with the extreme tip smooth and glossy. The pore is very small, situated very close to the apex, and it appears to be divided by a slight transverse septum, across the middle. The

sculpture consists of very numerous radiating striæ, which are decussated by fine and close, raised, regularly concentric lines of growth of about the same size as the radii on the upper portion, where the shell is minutely cancellated, but on the lower part of the shell the concentric lines become larger and more distant, and have the form of regular raised cinguli; the intervals between these, which are two or three times as wide as the ridges, are crossed by the much finer and closer radiating lines, which do not produce a regular cancellated appearance on this part. Both the radiating and longitudinal lines are so fine as scarcely to be visible without a lens. Internally the surface is nearly smooth and lustrous, and the external sculpture shows through the substance of the shell. In the apex there is a minute transverse lamina, forming a small flattened tube.

The anterior slope of the shell, seen in profile, is broadly rounded; the posterior slope falls off abruptly at first, near the apex, and then slopes regularly to the posterior margin, with a nearly straight, or but slightly convex outline. The side-slopes are steep, regularly and slightly convex.

Length, 5^{mm}; breadth, 3^{mm}; height, 2^{mm}.

Station 2096, N. lat. 39° 22′ 20″, W. long. 70° 52′ 20″, in 1451 fathoms (No. 35,174). One living specimen.

The animal has well developed, moderately stout, blunt tentacles; frontal disc broad, semicircular, with the lateral angles prolonged backward.

Propilidium elegans Verrill, sp. nov.

Shell small, very thin and fragile, translucent bluish white, rather depressed, elongated-elliptical, with the recurved apex situated at about the posterior third. The nuclear whorl is very minute, smooth, glassy, compressed, strongly involute and turned a little to the left, forming a complete whorl, visible in a side view. The whole surface, under the microscope, has the appearance of a very fine shagreen. This is produced by very minute, short, wavy, raised lines, which are mostly arranged in zigzag or in herring-bone style; in some parts the two sets of lines, running obliquely, cross each other at nearly right angles; on other portions one or both sets are replaced by minute punctations, or granulations. This sculpture is visible only under a strong lens or with the compound microscope.

The internal lamina or septum is narrow, crescent-shaped, situated behind and some little distance below the extreme apex, and not

forming an elongated channel; it is distinctly visible from the outside, owing to the translucency of the shell.

Length of shell, 3·5^{mm}; breadth, 2·5^{mm}; height, about 1^{mm}.

Station 2105, N. lat. 37° 50′, W. long. 73° 03′ 50″, in 1395 fathoms (No. 38,072). Two specimens, living.

The animal has a short, broad-ovate foot, subtruncate in front, with the edge frilled. Frontal disk rather large, broad, semicircular or crescent-shaped, with the angles extending back in a large obtuse lobe on each side. Buccal area semicircular; mouth surrounded with four convex elevations, one before and one behind it, and one on each side. Tentacles slender, tapering, acute. Eyes apparently wanting. No cirri on mantle.

POLYPLACOPHORA.

Placophora (Euplacophora) Atlantica Verrill and Smith, MSS.

Verrill, Amer. Journ. Sci., vol. xxiv, p. 365, Nov., 1882.

PLATE XXX, FIGURES 1, 1*a*, 1*b*.

Outline broad-ovate. Marginal membrane very broad anteriorly and narrow posteriorly. It increases gradually from the posterior end to a point opposite the fifth plate, where it suddenly expands into a broad round front, with the breadth one-third greater than the greatest breadth of the shell, and projecting forward to a distance equal to one-half the length of the shell. The marginal membrane is thick, leathery, and scabrous, everywhere closely covered with minute spinules; the lower surface anteriorly shows many radiating grooves (not distinct in the smaller examples); between these are rows of slightly raised small verrucæ, covered with small spinules. The inner edge, or mantle-border, is sharply defined, enclosing an elliptical area around the head and gills, with a well-marked posterior sinus; its front edge is divided into about seven digitations, the anterior ones rather long, tapering, and tentacle-like, but coriaceous and covered with fine spinules, like the rest of the marginal membrane. Cephalic hood large, broad-lunate; foot relatively small, ovate. Gills numerous (in the largest about sixteen on each side), extending nearly the whole length (more than two-thirds) of the foot, but reaching neither end of it.

The shell is broad-ovate, slightly carinated in the middle; valves short, broad, the posterior ones decreasing rapidly in breadth, the last one very small. Anterior valve short, very broadly rounded in front; posterior edge with a very obtuse reëntrant angle and a

slight, rounded, median notch; the surface is marked with faint radiating grooves, and is uniformly covered with small rounded granules. The succeeding valves have their posterior border nearly straight, with a slightly projecting, obtuse, median beak, from which run well-marked, elevated, rounded diagonal ribs; the lateral areas are somewhat raised, with a depression next the ribs, and their surface is covered with small, low rounded granules, more distinct than those on the median areas, which appear nearly smooth to the naked eye, but are crossed by evident transverse lines of growth. The posterior valve has the posterior edge a little upturned, and slightly emarginate in the middle, with a submarginal, raised rib near the posterior margin above; the upper edge overhangs the lower lamina but slightly, or not at all, in the smaller specimens, with a deep groove between; the lower lamina is more deeply emarginate, in the middle, than the upper one, with wider laminæ each side of the notch, but in the largest example the upper portion is divided into several laminæ, and projects decidedly beyond the lower, while the notch is obsolete. (Perhaps this is due to injury during life.)

When detached, the inserted edges of the valves are very narrow, the front edge of the anterior valve is narrower than the upper, lamina thickened and divided into numerous (about thirty) small, rough and unequal denticles, which become obsolete near the lateral angles. The median plates have the lateral insertion plates small, truncate, not projecting beyond the upper lamina, with a well-marked groove between, and separated from the anterior insertion plates by a deep narrow notch, in line with the diagonal ribs; the anterior plates are broadly rounded, not very wide, separated by a rather wide rounded median notch.

Color of marginal membrane dull rusty or yellowish brown; shell grayish white, stained with brown.

Length of the largest specimen, in alcohol, 32^{mm}; its greatest breadth, 26^{mm}; length of shell, 21^{mm}; greatest breadth, 18^{mm}; length of anterior valve, 4^{mm}; its breadth, $15{\cdot}5^{mm}$; length of exposed part of 3d valve, 4^{mm}; of posterior valve, $4{\cdot}7^{mm}$; its breadth, 8^{mm}; extent of marginal membrane beyond the shell, anteriorly, 12^{mm}; length of foot, 12^{mm}; breadth of foot, 8^{mm}; length of head, 3^{mm}; breadth, 7^{mm}.

A small specimen is 21^{mm} long; breadth, 16^{mm}; expanse of membrane in front of shell, $6{\cdot}5^{mm}$; length of shell, 16^{mm}; its breadth, $13{\cdot}5^{mm}$.

When living the marginal membrane was relatively broader.

Station 1124, N. lat. 40° 01′, W. long. 68° 54′, in 640 fathoms, off Nantucket Island, 1882; station 2067, N. lat. 42° 15′ 25″, W. long. 65° 48′ 40″, in 122 fathoms, 1883.

Trachydermon exaratus (G. O. Sars).

Lophyrus exaratus G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 113, pl. 8, figs. 1, *a–k*, pl. II, fig. 1 (dentition.)

Trachydermon exaratus Verrill, Amer. Journ. Sci., vol. xxiv, p. 365, Nov., 1882.

PLATE XXX, FIGURES 2, 2*a*, 2*b*.

Elongated, oblong-elliptical, strongly convex; valves distinctly obtusely carinated medially. Anterior valve nearly semi-circular in front; the posterior edge forming an obtuse reëntrant angle, with a rounded notch in the middle; surface distinctly radially grooved with single rows of rounded granules between the grooves, becoming larger toward the margin.

Median valves are moderately wide, nearly straight posteriorly, the hinder ones with a slight median beak with distinct diagonal furrows and ridges, dividing them into median and lateral areas; the median areas are covered, on the sides, with fine but very distinct longitudinal grooves, with the intervening ridges narrow and rounded, more or less confluent and broken up into granules, near the diagonal lines, toward the median ridge becoming finer and irregular, and finely granulous anteriorly and along the carina. The lateral areas are more elevated and covered with stronger radiating ridges, broken up into oblong and rounded, flattened granules, and separated by narrow radial furrows. The lateral insertion-plates of the median valves project but little beyond the upper lamina; they are subtruncate, with a thin notch or slit corresponding to the diagonal line above. The posterior valve is transversely elliptical, with the posterior edge evenly rounded; the front area as in the preceding ones; the posterior area is covered with fine radial and concentric grooves, dividing it into radiating rows of small rounded granules; the articulating plates of its front edge are rather wide, broadly rounded or subtruncate, and separated by a broad, rounded median sinus; posteriorly the inner surface is marked by about sixteen radiating lines, terminating in thin notches of the inserted edge, which is very narrow and simple.

The marginal membrane is rather narrow and covered with rather stout, prominent, oblong and obtuse spinules, regularly arranged in quincunx, their ends looking like granules; at the edge and on the lower side these are replaced by small, slender spinules.

Head rounded; hood large, the sides produced backward into rounded lobes. Foot long and rather narrow. Gills about twenty-four on each side, extending from the posterior end of the foot to about its anterior third.

Length, 17^{mm}; breadth, 8^{mm}; height, 5·5^{mm}; length of shell, 15·5^{mm}; breadth, 7^{mm}; length of 1st valve, 3^{mm}; breadth, 6^{mm}; length of 3d valve, exposed part, 2^{mm}; breadth, 7^{mm}; length of posterior valve, 3·5^{mm}; breadth, 6^{mm}.

Station 1120, in 194 fathoms, off Martha's Vineyard, 1882; station 2069, in 101 fathoms, N. lat. 41° 54′ 50″, W. long. 65° 48′ 35″, 1883.

This species is readily distinguished from *T. albus* by the very distinct differentiation of the valves into median and lateral areas, having lines of sculpture running in different directions, and by the much coarser granulation of their surfaces. In *T. albus* there are no distinct lateral areas; the radiating grooves and ridges are absent; and the granulation is so fine and obscure as to be scarcely visible without a lens. The spinulation of the marginal membrane is similar in the two species.

TECTIBRANCHIATA.

Scaphander nobilis Verrill, sp. nov.

PLATE XXXII, FIGURES 18, 18*a*, 18*b*, 18*c*, 18*d*.

Shell large, swollen, stout, broad-ovate in outline, thin, translucent, and of an exceedingly delicate texture. The body-whorl is very large in proportion to the rest of the shell. The aperture is large, broad-ovate in the anterior part, narrowed and curved posteriorly, extending to the apex of the shell, where it terminates in a notch, the outer lip extending back considerably beyond the notch. The aperture is much encroached upon by the convexity of the body-whorl, but about the middle the inner lip is strongly excavated and forms a broad and somewhat sinuous curve; the outer lip is very broadly and evenly rounded throughout most of its extent; anteriorly the curvature forms the arc of a circle; posteriorly it extends back beyond the apex of the shell in the form of an obtuse and slightly everted process, with its posterior margin concave, somewhat sinuous and spiral, and a little thickened. The surface is smooth and polished, somewhat shining, and everywhere covered by spiral lines formed by series of oblong dots, which are decidedly sunken below the surface, and separated by intervals about equal to or less than

their own length. The spiral lines are unequal in fineness, the broader ones alternating with finer ones in which the dots are very narrow; the intervals between the spiral lines are also variable in breadth. None of the specimens appear to have a distinct epidermis.

Length of shell to apex of one of the largest specimens, 35^{mm}; breadth, 25^{mm}; length of aperture, 37^{mm}; greatest breadth of aperture, 18^{mm}.

Off Martha's Vineyard, at stations 2052, in 1098 fathoms; 2074, in 1309 fathoms; 2076, in 906 fathoms; 2077, in 1255 fathoms; off Delaware Bay, stations 2102, in 1209 fathoms; and 2103, in 1091 fathoms (No. 35,374). It was most common at station 2102, N. lat. 38° 44′, W. long. 72° 38′, in 1209 fathoms, where thirteen specimens were taken, ten of them living (No. 35,641).

This species bears some resemblance to *S. punctostriatus* (Migh.) H. and A. Ad., but is much thinner, with a far more delicate texture. Its form is much shorter and more swollen in the middle, and the spiral lines are less numerous, with wider intervals, and have the punctations larger and not so close together, giving a much smoother appearance to the surface, although the punctate character is quite as evident. The aperture is also much broader, especially in its anterior half, while the body-whorl projects into it much more strongly. The inner lip is much thinner and shows only a slightly thickened fold along the columella-margin. Posteriorly the shell is not at all narrowed, but is evenly rounded instead of being pinched up as in *S. punctostriatus*. The posterior process of the outer lip is more flaring, and extends farther backward beyond the apex. The apex of the shell is nearly plain and smooth, though sometimes slightly indented, and does not have a thickened deposit of enamel extending beyond the edge of the notch, as in the latter.

Actæon melampoides Dall.

Bull. Mus. Comp. Zool., vol. ix, p. 95, 1881.

Station 2115, off Cape Hatteras, in 843 fathoms, one specimen (No. 35,565).

The original specimens, described by Mr. Dall, were from the Gulf of Mexico, in 310 fathoms, Blake Expedition. I have compared our example with Mr. Dall's specimens.

HETEROPODA.

Atlanta inclinata Souleyet.

Souleyet, Voy. de la Bonite, vol. ii, p. 375, atlas, pl. 19, figs. 9–15, 1852.

Station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, at the surface, one living specimen (No. 38,227); station 2110, N. lat. 35° 12′ 10″, W. long. 74° 57′ 15″, three dead specimens (No. 35,493); station 2115, N. lat. 39° 49′ 30″, W. long. 74° 34′ 45″, one dead specimen (No. 38,316).

According to Souleyet, this species is found both in the Atlantic and Pacific Oceans.

Atlanta rosea Souleyet.

Souleyet, Voy. de la Bonite, vol. ii, p. 377, atlas, pl. 19, figs. 16–20, 1852.

Station 2084, with the preceding, one living specimen (No. 35,180); and station 2099, N. lat. 37° 12′ 20″, W. long. 69° 39′, at the surface. One living specimen (No. 38,258).

This species is more common in the warmer parts of the Atlantic.

Atlanta Gaudichaudii Eydoux and Souleyet.

Voyage de la Bonite, Zool., vol. ii, p. 379, atlas, pl. 19, figs. 29–34, 1852.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, four living specimens (No. 38,372); station 2046, N. lat. 40° 02′ 49″, W. long. 68° 49′, two living (No. 38,273); station 2100, N. lat. 39° 22′, W. long. 68° 34′ 30″, two living (No. 38,369).

Atlanta Lamanonii Eydoux and Souleyet.

Voyage de la Bonite, Zool., vol. ii, p. 371, atlas, pl. 18, figs. 30–37, 1852.

Station 2037, N. lat. 38° 53′, W. long. 69° 23′ 30″, one dead specimen (No. 38,366). A single dead specimen is referred to this species with some doubt, although it agrees pretty closely with the description and figures referred to.

Atlanta pulchella Verrill, sp. nov.

Shell minute, composed of about four whorls, very thin, transparent and lustrous, compressed, with a rather high, exceedingly thin keel, commencing just back of the notch of the aperture and extending around rather more than half the circumference of the last whorl.

The spire is small, scarcely oblique, slightly elevated, its apex not rising above the level of the last whorl. Suture of the last whorl, well marked. The umbilicus is small, and shows within it only about one and a half whorls. The extreme apex is smooth, but the succeeding two or three whorls are covered with four or five well marked, revolving lines, which fade out on the penultimate whorl. The last whorl, which constitutes the greater part of the shell, is a little inflated on the ventral side, with the sides slightly convex and the dorsal portion compressed; its surface is polished and marked by faint lines of growth, and sometimes shows faint, microscopic, spiral lines on the left side. The aperture is narrow-ovate, acute above and rounded below. The notch is rather wide and moderately deep.

Color, transparent white, with a faint, chestnut-brown, sutural line. In alcohol the animal shows several very distinct black spots.

Diameter, about 1·25^{mm}.

Taken in abundance, from the surface, at station 2100, off Delaware Bay, N. lat. 39° 22′, W. long. 68° 34′ 30″, October 3rd, 1883 (No. 38,397), with the temperature of the surface water 69° F.; and in smaller numbers at station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, July 26th, 1883 (No. 38,410), temperature of the surface water 76·5° F.

This minute shell is easily distinguished from our other species by its compressed form, with closely coiled whorls and small, erect spire, and especially by the distinct spiral sculpture of the earlier whorls. It appears to be the most abundant species off our northern coast.

Firola Keraudrenii Eydoux and Souleyet.

Voyage de la Bonite, Zool., vol. ii, p. 349, atlas, pl. 16, figs. 8-10, 1852.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, twenty-five living; station 2039, N. lat. 38° 19′ 26″, W. long. 68° 20′ 20″, five living. Also at other stations, usually in company with *Sagitta*.

PTEROPODA.

Cavolina quadridentata (Les.)

Hyalæa quadridentata Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 39, pl. 3, figs. 13-15.

Souleyet, Voy. de la Bonite, vol. ii, p. 147, atlas, pl. 4, figs. 25–32, 1852.

Station 2043, N. lat. 39° 49′, West long. 68° 28′ 30″, (No. 34,878); station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, (No. 38,260); and station 2109, N. lat. 35° 14′ 20″, W. long. 74° 59′ 10″, (No. 38,252).

Cavolina angulata (Souleyet.)

Hyalæa angulata Souleyet, Voy. de la Bonite, vol. ii, p. 152, atlas, pl. 5, figs. 1–6, 1852.

Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 42, pl. 12, figs. 3–4.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″; one living specimen, (No. 38,251.)

Cavolina gibbosa (Rang.)

Hyalæa gibbosa Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 38, pl. 10, figs. 3, 4.

Souleyet, Voyage de la Bonite, p. 144, atlas, pl. 4, figs. 13–19, 1852.

Hyalæa flava D'Orbigny, Voy., vol. v, p. 97, pl. 5, figs. 21–25, (t. Souleyet.)

Dead specimens of this species occurred at stations 1154, 2052, 2096, 2115. The most northern was 1154, N. lat. 39° 55′ 31″, W. long. 70° 39′, 1882.

Styliola subulata (Quoy and Gaimard.)

Cleodora subulata Quoy and Gaimard, Ann. des sc. nat., vol. x, p. 233, pl. 8, figs. 1–3.

Creseis spinifera Rang, Ann. des sc. nat., vol. xiii, p. 314, pl. 17, fig. 1.

Cleodora subulata Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 55, pl. 6, figs. 2–6.

Cleodora subulata Souleyet, Voy. de la Bonite, vol. ii, p. 192, atlas, pl. 8, figs. 5–9, 1852.

Station 2039, N. lat. 38° 19′ 26″, W. long. 68° 20′ 20″, four living specimens (No. 35,151); station 2043, N. lat. 39° 49′, W. long. 68° 28′ 30″, five specimens (No. 35,154); station 2108, N. lat. 35° 16′, W. long. 75° 02′ 30,″ one specimen; also at stations 2109 and 2115, off Cape Hatteras.

This species is common in the tropical parts of the Atlantic and in the Mediterranean.

Styliola virgula (Rang.)

Cleodora virgula Rang, Ann. des sc. nat., vol. xiii, p. 316, pl. 17, fig. 2.

Cleodora virgula Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 57, pl. 6, fig. 2, pl. 13, figs. 20–24.

Souleyet, Voy. de la Bonite, vol. ii, p. 196, atlas, pl. 8, figs. 18–25, 1852.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, three living specimens (No. 38,236); station 2039, N. lat. 38° 19′ 26″, W. long. 68° 20′ 20″, five living specimens (No. 38,250); station 2099, N. lat.

37° 12′ 20″, W. long. 69° 39′, one living specimen (No. 38,233); station 2100, N. lat. 39° 22′, W. long. 68° 34′ 30″, eleven living specimens (No. 38,243).

Styliola virgula, var. corniformis (D'Orb.)

Hyalœa corniformis D'Orb., Voy., vol. v, p. 120, pl. 8, figs. 20–23, (t. Souleyet).
Cleodora virgula, var., Rang and Souleyet, Hist. Nat. Moll. Ptéropodes, p. 57, pl. 13, fig. 22.
Cleodora virgula, var., Souleyet, Voy. de la Bonite, atlas, pl. 8, fig. 24, 1852.

This shell is very similar to the preceding, except that the posterior part is strongly curved to one side.

Living specimens occurred at stations 2039 and 2100, with the normal form, as given above.

Triptera columnella (Rang.)

Cuvieria columnella Rang, Ann. des sc. nat., vol. xii, p. 323, pl. 45, figs. 1–8.
Rang and Souleyet, Hist. Nat. des Moll. Ptéropodes, p. 59, pl. 4, figs. 1–11, and plate 14, figs. 1–6, 1852.

Station 947, off Martha's Vineyard 89 miles, one dead specimen (No. 38,196), 1880; station 1095, N. lat. 39° 55′ 28″, W. long. 69° 47′, one dead specimen (No. 38,163), 1882. Dead specimens were also dredged at stations 2041, 2043, 2084, 2096, 2109, 2110 and 2115. At the last named locality, off Cape Hatteras, twenty specimens occurred (No. 35,614). The most northern station was 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15′, where four specimens were taken. It is common in the tropical parts of the Atlantic.

Spirialis trochiformis Souleyet.

Atlanta trochiformis D'Orb., Voy., p. 177, pl. 12, figs. 29–31, (t. Souleyet).
Spirialis trochiformis Souleyet, Rev. Zool., p. 239; Voy. de la Bonite, vol. ii, p. 223, atlas, pl. 13, figs. 27–34, 1852.
Rang and Souleyet, Hist. Nat. Moll. Ptéropodes, p. 64, pl. 14, figs. 27-31.

Station 2100, N. lat. 39° 22′, W. long. 68° 34′ 30″, at the surface, numerous living specimens, (No. 35,222).

This species is common throughout the warmer parts of the Atlantic. It is particularly abundant in the Gulf Stream, off the coast of Florida.

Spirialis bulimoides Souleyet.

Atlanta bulimoides D'Orb., Voy., p. 179, pl. 12, figs. 36–38.
Spirialis bulimoides Souleyet, Rev. Zool., p. 138; Voy. de la Bonite, vol. ii, p. 224, atlas, pl. 13, figs. 35–42, 1852.
Rang and Souleyet, Hist. Nat. Moll. Ptéropodes, p. 64, pl. 15, figs. 3-4.

Station 2100, N. lat. 39° 22′, W. long. 68° 34′ 30″, at the surface, eight living specimens (No. 38,235).

This species occurs abundantly in all the tropical parts of the Atlantic, but has not previously been observed so far north, off the American coast.

Clione longicaudatus Souleyet.

Souleyet, Voyage de la Bonite, Zool., vol. ii, p. 286, atlas, pl. 14, figs. 17–21, 1852.
Rang and Souleyet, Hist. Nat. Moll. Ptéropodes, p. 80, pl. 15, figs. 28–32, 1852.

Station 2100, N. lat. 39° 22′, W. long. 68° 34′ 30″, off Delaware Bay, eight living specimens (No. 38,367).

Trichocyclus Dumereilii (Oken) Esch.

Chenu, Man. Conch., i, p. 117, fig. 514.

Station 2100, N. lat. 39° 22′, W. long. 68° 34′ 30″, off Delaware Bay, four living specimens (No. 38,379).

SCAPHOPODA.

Dentalium solidum Verrill, sp. nov.

Shell large, robust, thick and strong. Posterior third pretty regularly curved, but only moderately so; anterior half nearly straight, the amount of curvature varying in different individuals. Anterior aperture large, circular, moderately oblique, with the edge, when perfect, plain, thin and sharp, the shell rapidly increasing in thickness farther back, in the posterior half becoming very thick and solid. Posterior end tapering to a small extremity, the opening, when perfect, small, pear-shaped, with a moderately deep notch on the dorsal side and a shallower and more rounded one beneath. Surface, in perfect specimens, somewhat glossy, but covered with numerous close, very distinct, oblique lines of growth; the posterior half is also marked by shallow longtitudinal striations, or small impressed grooves, which are separated by intervals usually much wider than the grooves, but variable in width, with the margins of the grooves well rounded; at about the middle of the shell these lines become

faint, or entirely disappear, though a part of them sometimes continue to the anterior end, where they are distant and appear only as slightly indented furrows or depressions; at about the posterior third the number of grooves varies from twenty to forty.

Color, usually grayish or slaty brown externally, bluish white within; more perfectly grown and younger specimens are white on the anterior portion and only faintly bluish white within.

Length of an average specimen, 82^{mm}; diameter, at the anterior end, 10^{mm}; at the posterior end, 2^{mm}. A more slender specimen is 75^{mm} long; diameter of the oral end, 9^{mm}; of the posterior end 1·4^{mm}.

This species was taken in considerable numbers at numerous stations by the Albatross. Station 2050, in 1050 fathoms; 2052, in 1098 fathoms; 2077, in 1255 fathoms, numerous specimens, living and dead (No. 34,904); 2083, in 959 fathoms, two specimens (No. 34,687); 2084, in 1290 fathoms, numerous specimens, living and dead (No. 34,911 and No. 34,688); 2102, in 1209 fathoms, one specimen; 2103, in 1091 fathoms, numerous living specimens (No. 35,636); 2104, in 991 fathoms, two dead; and off Cape Hatteras, at station 2111, in 938 fathoms, numerous living specimens (No. 35,635); 2115, in 843 fathoms, one fine specimen (No. 35,645).

This fine large species might readily be taken for a gigantic form of *D. striolatum* or *D. occidentale*. It is, however, a much stouter shell than either of these, of a thicker and firmer substance, and with a relatively larger aperture. It differs also in the character of the longtitudinal sculpture. In *D. occidentale* the longitudinal grooves are more numerous, broader and deeper, having more the character of true furrows, with the intervening ridges mostly narrower than the grooves, from which they rise rather abruptly, with well-defined border, while in the present form the grooves are merely depressions in the general surface of the shell, with indefinite borders.

In *D. striolatum* the longitudinal sculpture is almost obsolete, except near the posterior end; and such lines as exist have the same character as in *D. occidentale*, though fainter, the two forms possibly being only varieties of one species. The most perfect specimens of *D. solidum* have also two posterior notches, while in *D. striolatum* there is usually a single notch on the dorsal side, but the character of the posterior aperture seems to be variable in most of the species of this group.

Dentalium occidentale, var. **sulcatum**, nov.

Shell of moderate size, thin, translucent white tinged with very pale yellowish or bluish, moderately curved, more decidedly behind the middle, tapering regularly and rather rapidly from the anterior to the very slender posterior end. The entire surface is covered by well marked, nearly regular, narrow raised ribs with nearly perpendicular sides and rounded summits, separated by well-defined, strongly marked, concave grooves, which are about twice the width of the ribs anteriorly, but posteriorly are of about the same width. The ribs and furrows show on the interior of the shell within the aperture, in reverse, the whole thickness of the shell conforming to the sculpture as if they were corrugations of its substance. The oral aperture is relatively large and circular, very little oblique, and usually with the very thin edge more or less broken. Posterior aperture very small, usually plain and without any notches, but in one of the most perfect specimens it has a slight lateral notch on each side; in others there is a small dorsal notch.

Length of one of the largest specimens, 20^{mm}; diameter at the anterior end, 3^{mm}; at the posterior end, ·6^{mm}. Some specimens are slightly more slender than the one measured.

Station 2076, in 906 fathoms, one living specimen; station 2077, in 1255 fathoms, four living (No. 35,093), and station 2079, in 75 fathoms, one living specimen.

This variety resembles *D. candidum* Jeffreys in its form and longitudinal sculpture, but lacks the transverse lines between the ribs; the posterior end is also more slender and more curved than shown in his figure. It also closely resembles some young specimens of the typical *D. occidentale*, but the latter has not so strongly marked and regular ribs and grooves, nor does the sculpture extend entirely through the thickness of the shell so as to appear on the inside, as in the present form. Specimens often occur, however, that are evidently intermediate between the two forms, in the character of the sculpture and thickness of the shell.

Dentalium, sp. g.

Shell small, very slender, considerably curved. Surface covered with very numerous, regular, microscopic, longitudinal lines, separated by narrower striæ. Anterior aperture circular, slightly oblique. Posterior aperture very small, squarely truncated in one specimen, oblique in the other, without any slit.

Length of the largest example, 6^{mm}; diameter of the oral end, ·8^{mm}; posterior end, ·3^{mm}.

Station 2037, in 1731 fathoms; and station 2038, in 2033 fathoms (No. 35,142).

These specimens are probably young, but differ from all of our recognized species in the peculiar sculpture, in the form of regular, microscopic, longitudinal striæ. They may, however, prove to be the young of *D. capillosum* J., which we have not yet recognized among the specimens dredged on our coast. There is, also, a slender shallow-water species, from off Cape Hatteras, which has, when young, similar fine striations, but the lines are not so numerous and the shell is straighter.

Dentalium, sp. h.

Shell small, slender, nearly straight, or very gently curved. The sculpture consists of fifteen to twenty narrow, elevated, angular ribs, which diminish in size posteriorly and become nearly obsolete near the tip; anteriorly they are separated by much broader, clearly defined, concave grooves, the sculpture showing in reverse on the interior surface. Oral aperture circular, somewhat oblique. Posterior opening small, circular, squarely truncated.

Length, 15^{mm}; diameter at the oral end, 1·5^{mm}; at the posterior end, ·8^{mm}.

Station 2038, in 2033 fathoms, three specimens (No. 35,165). One specimen, differing from those described in being more slender and having more numerous and finer longitudinal ribs, was taken at station 2115, in 843 fathoms.

These specimens are probably the young of one of the larger species. They resemble the young of some of the varieties of *D. occidentale*, except that they are more slender and straighter. It is not improbable, however, that they may prove to be forms of that variable species.

Siphodentalium teres Jeffreys.

Jeffreys, Proc. Zool. Soc. London, for 1882, p. 661, pl. 49, fig. 5.

Station 2072, in 858 fathoms (No. 38,088); station 2084, in 1290 fathoms (No. 38,084); and station 2115, off Cape Hatteras, in 843 fathoms (No. 35,625).

It was taken off the coast of Europe by the Porcupine Expedition, in 1870.

Cadulus grandis Verrill, sp. nov.

General appearance of the shell much like that of *C. Pandionis*, but more than twice as large, without the abrupt bulging at the largest part, which is a characteristic feature of the latter, and with a relatively larger posterior aperture.

The shell is, for the genus, large and strong, translucent bluish white when living, milk-white when dead, with a highly polished surface, only faintly marked by the lines of growth when perfect. The shell is moderately curved, the greater part of the curvature being behind the middle, and is largest at about the anterior third, the decrease being very gentle and regular in both directions, but a little more rapid towards the anterior end. The dorsal side is a little flattened towards the aperture, which is decidedly oblique and very broad-elliptical. The posterior aperture is relatively rather large, circular, with the edge a little thickened and divided into four rounded notches, the two upper ones being usually a little deeper and farther apart than the two ventral ones.

Length of one of the largest examples, 15^{mm}; greatest diameter, $3{\cdot}5^{mm}$; transverse diameter of the oral end, 3^{mm}; vertical diameter, $2{\cdot}5^{mm}$; diameter of the posterior end, $1{\cdot}3^{mm}$. Some specimens exceed these dimensions.

This species occurred at station 2052, in 1098 fathoms; station 2076, in 906 fathoms, sixteen specimens, mostly living (No. 34,735); station 2084, in 1290 fathoms, three specimens (No. 35,184); station 2103, in 1091 fathoms, one specimen; station 2111, in 938 fathoms, one dead specimen; station 2115, in 843 fathoms, six dead specimens. From station 2043, in 1467 fathoms, one large malformed specimen occurred, apparently belonging to this species (No. 38,116).

This species might readily be mistaken for a large form of *C. Pandionis*, but it differs from the latter in having a larger posterior aperture, a more nearly circular oral aperture, and especially in the absence of the abrupt bulging at the largest part. The form is usually less curved, although in this respect both species are somewhat variable. This shell is, however, much thicker and in every way more robust.

Cadulus Watsoni Dall.

Dall, Bull. Mus. Comp. Zool., vol. ix, p. 34, 1881.

The specimens referred to this species resemble, in size and general character, *C. Pandionis*, and, like that species, have the mouth

decidedly oblique and slightly elliptical, though somewhat more nearly circular than in the latter. The posterior portion is somewhat less tapered and has the terminal opening a little larger. Its border, when perfect, is usually furnished with four shallow notches, the two nearest the dorsal side being somewhat larger than the others. The most marked distinction is in the more gently tapered form and in the absence of any distinct gibbosity or swelling at the widest portion, the decrease in size being very gradual toward both ends, while in *C. Pandionis* the widest portion forms a somewhat abrupt enlargement, often amounting to a slight rounded angle when seen in a dorsal view. This feature, with its smoothness, renders it somewhat difficult to pick up fresh and moist specimens of the latter with forceps. Both species differ considerably in the amount of the curvature of the posterior part of the shell.

One of our larger specimens is 11^{mm} long; greatest diameter, 2·1^{mm}; transverse diameter at the anterior end, 1·9; diameter at the posterior end ·9^{mm}.

This species occurred at station 2048, in 547 fathoms, eight living specimens (No. 34,814); station 2092, in 197 fathoms, nine specimens (No. 38,122); and off Cape Hatteras, at station 2111, in 938 fathoms, one specimen (No. 35,765); and station 2115, in 843 fathoms, thirty-six specimens (No. 35,623).

This species is also closely related to a shallow-water species taken in abundance by the Albatross, off Cape Hatteras, in 14 to 48 fathoms. The latter is, however, a smaller species, with a more slender posterior portion and a perfectly circular aperture.

Cadulus cylindratus Jeffreys.

Jeffreys, Ann. Mag. Nat. Hist., February, 1877, p. 158; Proc. Zool. Soc. London, for 1882, p. 664, pl. 49, fig. 6.

The few specimens referred to this species show some variation in form, some being decidedly curved, others only very slightly so. The shell tapers very slightly from the middle toward both ends, which are very nearly equal in size, circular, and scarcely contracted. The oral aperture is slightly oblique. The posterior opening, in our specimens, is finely and irregularly notched, probably accidentally.

Length, 7·3^{mm}; greatest diameter, 1·7^{mm}; diameter of the oral end, 1·4^{mm}; posterior end the same.

Station 2041, in 1608 fathoms, three specimens (No. 38,030).

Off the coast of Europe, it was taken at several localities by the

Porcupine and Valorous Expeditions, and in the Bay of Biscay by the Travailleur Expeditions. It has occurred at depths ranging from 652 to 1450 fathoms.

LAMELLIBRANCHIATA.

Thracia nitida Verrill, sp. nov.

PLATE XXXII, FIGURE 22.

Shell thin, tumid, broad-ovate, gaping considerably posteriorly and slightly anteriorly. Umbos prominent, situated in advance of the middle, with the beaks strongly incurved and turned forward, leaving a broad, depressed, cordate lunular area, which is not defined by any definite boundary. The posterior dorsal margin descends slightly; the posterior margin is slightly prolonged and bluntly rounded; the ventral margin is broadly curved, becoming nearly straight in the middle; the anterior margin is obliquely rounded. The surface is nearly smooth, shining, and iridescent, marked with inconspicuous lines of growth, and covered with very minute, regularly scattered granule-like elevations, each of which bears a minute hair-like process, when not rubbed; towards the posterior end these are more numerous and conspicuous, and are arranged in regular delicate radiating lines, but over the greater part of the shell they are scarcely visible to the naked eye. Epidermis very thin, greenish yellow. Hinge-margin slender, somewhat thickened along the ligamental groove, and with a slight notch anteriorly for the reception of the minute cartilage. No ossicle was detected in the alcoholic specimen. Pallial and muscular impressions faint.

Length, 21^{mm}; height, 18^{mm}; thickness, 14^{mm}.

The animal has a circle of sixteen large, tapered, acute tentacles around the common base of the siphons, which are brown in alcohol. The efferent tube is somewhat prolonged in the contracted specimen, but the other is entirely withdrawn.

Station 2097, off Chesapeake Bay, in 1917 fathoms (No. 35,267).

Poromya sublevis Verrill, sp. nov.

PLATE XXXII, FIGURE 21.

Shell rather large for the genus, short, high, tumid, with prominent umbos and large beaks, which are curved inward and forward. The length of the shell is considerably less than the height from the beak to the ventral margin. Anteriorly the lunular region is large and some-

what excavated, rather indistinctly defined by feeble undulations. The anterior end is short, very obtusely rounded or subtruncate; the ventral margin is broadly rounded, slightly obliquely produced a little behind the middle, forming there a scarcely distinct, rounded angle, from which a posterior, ill defined, rounded ridge runs up to the beak; posterior end very obtusely rounded and somewhat oblique; posterior dorsal margin descending rapidly from the beak and slightly convex. Surface nearly smooth to the naked eye and covered with a very thin, pale yellowish epidermis; under a lens the whole surface, except on the umbos, is covered with very slight, rather distinct radiating lines of very minute pointed granules, which are pretty evenly spaced along the lines, rather distantly on the middle area of the shell, but becoming much more numerous toward the posterior end, where they are connected by distinct but very fine raised lines, which appear to be chiefly epidermal; one line, more distinct and more elevated than the rest, runs from behind the beak to the upper part of the posterior margin, defining a narrow posterior dorsal area. The minute granules scattered over the surface appear to be chiefly due to the epidermis, but where the surface is somewhat rubbed they still appear as minute specks, which become very fine and irregularly scattered on the umbos; where most perfect, each granule is surmounted by a minute sharp process of the epidermis. The margin is sharp and plain, with a thickened interior ridge a short distance within the edge. The hinge consists of a large, stout, obtuse tooth, just below the beak, which projects considerably inward and is divided at the summit into three low, rounded lobes or cusps, of which the most interior is the largest and most prominent, while the outermost is confluent with the lunular margin; a supporting ridge runs from the inner margin of the tooth both forward and backward to the margins; posteriorly, between this ridge and the margin, there is a very narrow and long, curved ligamental groove, running forward and terminating just under the beak above the center of the large tooth; a small, divergent, somewhat raised ridge-like process, grooved on top, intervenes between the anterior part of the ligamental furrow and the principal tooth. The inner surface of the shell is opaque white, and marked with slight irregular lines and grooves and with feeble undulations parallel with the lines of growth. Externally the shell is white beneath the thin, pale yellow epidermis.

Length, 13·5^{mm}; transverse breadth, 6^{mm}; height, from apex to ventral margin, 14·5^{mm}.

Station 2097, N. lat. 37° 56′ 20″, W. long. 70° 57′ 30″, in 1917 fathoms (No. 35,263), one dead but fresh specimen.

This species is very distinct from *P. granulata* and *P. rotundata* Jeff., both in form and in the character of the surface, which in both the latter forms is covered with comparatively large, rounded granules or small pustules, often closely crowded together, while in this species the granules are almost microscopic in size and separated by comparatively wide intervals, or they even appear remotely scattered on some parts, so that the shell presents a nearly smooth appearance to the naked eye, or when moderately magnified, which is strongly in contrast with both the other described forms. The form of the shell in this species is also much shorter and more tumid, with higher umbos and more prominent beaks. The character of the hinge, however, agrees pretty closely with that of *P. granulata*, but the tooth is larger and stronger.

Neæra undata Verrill, sp. nov.

A large species remarkable for its short broad form, its abbreviated siphon and the undulated character of the surface. Shell broad-ovate, not much swollen, with the beaks not far from the middle. The posterior dorsal margin descends rapidly in a nearly straight line; the posterior end is broadly, obtusely truncated and only slightly prolonged; the ventral margin is very broadly curved; the posterior margin less broadly rounded. The surface, especially anteriorly, is covered with undulations formed by narrow, raised, subtriangular ridges separated by rather wide, shallow, concave intervals, much as in most species of Astarte. These fade out, more or less, posteriorly and toward the ventral margin, where they are replaced by regular, concentric, raised lines. Hinge-margin of the right valve moderately thick. The cartilage-pit is not very large, descending, directed obliquely backward. Posterior lateral tooth is not very prominent, having the form of an elongated, thickened ridge, its most prominent point only a short distance back of the cartilage.

Length, 24^{mm}; height, 18^{mm}; thickness, 13^{mm}.

Station 2098, off Chesapeake Bay, in 2221 fathoms. A single valve, considerably broken, (No. 35,256).

Neæra gigantea Verrill, sp. nov.

Shell very large, thick and opaque, short, stout, with prominent umbos, and short, wide beak, with the muscular scars and pallial lines deeply sunken. The shell is swollen and broadly rounded in front, with the ventral edge broadly rounded, narrowing gradually to the

beak, which is scarcely differentiated from the ventral line of the shell. The beak is very short and broad, rapidly narrowing to the blunt tip, which is a little bent to one side; the dorsal line, behind the beaks, is nearly straight, sloping pretty regularly to the beak. The umbos are large, prominent, swollen, strongly incurved and turned somewhat backward. The cartilage-pit is of moderate size, ovate, and directed obliquely backward, its posterior border adherent to the posterior hinge-border, while its inner and anterior edges are more or less free. Lateral tooth apparently but little developed, but the left valve has the anterior hinge-line broken. There is a notch in the edge of the shell opposite the cartilage-pit, in each valve. The sculpture consists only of irregular, concentric, raised lines or ridges, most of which are not continuous; these become strong or more irregular on the beak; they are often crossed very obliquely by the finer, raised lines of growth.

Length, about 38^{mm}; height, about 26^{mm}; transverse breadth, 16^{mm}.

Station 2097, off Chesapeake Bay, in 1917 fathoms, (No. 35,255).

The only specimen obtained consists of both valves, but neither is entire, so that the measurements cannot be accurately made. In these the shell is remarkably thickened by a calcareous deposit on the inside of the shell, so that all the muscular scars appear as sunken pits; this great thickening of the shell, however, may be abnormal. This shell appears to be larger and more massive than any known species. It is remarkable for its short, swollen form, and short, broad beak. It has no radial sculpture.

Abra longicallis (Scacchi).

Tellina longicallis Scacchi, Not., p. 16, pl. 1, fig. 7, (t. Dall).

Abra longicallis G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 74, pl. 6, fig. 3; pl. 20, fig. 4, 1878.

Syndosmya longicallis Dall, Bull. Mus. Comp. Zool., ix, p. 133.

Scrobicularia longicallus Jeffreys, Proc. Zool. Soc. London, for 1884, p. 145.

Station 2043, N. lat. 39° 49′, W. long. 68° 29′ 30″, in 1467 fathoms, one valve.

The specimen referred to, I have compared with those taken by the "Blake" in the Gulf of Mexico, in 860 fathoms, and identified by Mr. Dall as this species. They do not differ in any respect. The shell of *Abra lioica* (Dall) is shorter, rounder, and more swollen.

Tellimya ferruginosa (Mont.)

Mya ferruginosa Montague, Test. Brit., p. 44, pl. 26, fig. 5.
Tellimya ferruginosa G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 70, pl. 20, figs. 1*a–c*.

PLATE XXX, FIGURE 13.

This species was taken living, in considerable numbers and on several occasions, at and just below low water mark, in sand and mud, at the Gutters, on Naushon Island, near Wood's Holl, August, 1883, by the Fish Commission parties. It had not previously been definitely determined as inhabiting the American coast.

On the European coast it occurs from the Gulf of Lyons to northern Norway, at Lofoten and West Finmark, and from 7 to 85 fathoms in depth. It has also been found in the Coralline Crag in England, and in the Post-glacial deposits.

The animal is active and opens freely and widely. It often lies for a long time on the back with the valves gaping widely, the foot more or less extended and twisting about, and the elegantly frilled mantle edge broadly expanded and extending considerably beyond the edge of the shell, all around. Animal translucent white. The foot is long, ligulate, very flexible, in full extension longer than the shell, in partial contraction broad at base with a long groove on the edge and an ill-defined white stripe in the center. It can be flattened out so as to be used as a creeping foot. The foot issues from the middle of the ventral edge of the shell. Mantle with the outer edge broad and delicately frilled and undulated and with small papillæ. It projects all around the edge of the shell, except close to the hinge. Ventral opening for the foot long, and large, bordered with small papillæ. Posteriorly a pouch-like lobe of the mantle often protrudes below the anal opening, which is widely separated from the ventral slit; it is a simple opening of the mantle, often a little prominent, but more often not at all so. Several (7 or 8) large and small ones lived several days in confinement.

Montacuta tumidula Jeffreys.

Jeffreys, Brit. Conch., vol. v, p. 177, pl. 100, fig. 5, 1869.
G. O. Sars, Mol. Reg. Arct. Norvegiæ, p. 69, pl. 19, figs. 18*a–b*.

Station 2103, off Delaware Bay, in 1091 fathoms; and station 2115, off Cape Hatteras, in 843 fathoms, one specimen (No. 38,190).

Off Lofoten, 100–120 fathoms; off Hebrides and Shetland, 40–80 fathoms; Mediterranean.

Cryptodon tortuosus (Jeffreys.)

Axinus tortuosus Jeffreys, Proc. Zool. Soc. London, for 1881, p. 702, pl. 61, fig. 6.

Station 2078, in 499 fathoms, two specimens; station 2084, in 1290 fathoms, four living specimens (No. 38,175); and station 2115, off Cape Hatteras, in 843 fathoms, two living specimens (No. 35,611).

Off the European coast, it was taken by the Porcupine Expedition, in 1870, and by the Travailleur Expedition, in the Bay of Biscay. It occurred in 645 to 1012 fathoms.

Malletia obtusa (M. Sars) Mörch.

Yoldia obtusa G. O. Sars, Remarkable Forms of Animal Life, p. 23, pl. 3, figs. 16–20, 1872.

Malletia obtusa G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 41, pl. 19, figs. 3, *a–b*. Jeffreys, Proc. Zool. Soc. London, for 1879, p. 586.

This species occurred at stations 2018, 2041, 2042, 2043, 2076, 2077, 2084, 2095, 2096, 2102, 2105, 2106, 2110, 2115, in 516 to 1608 fathoms. It was most common at station 2043, N. lat. 39° 49′, W. long. 68° 28′ 30″, in 1467 fathoms, fifteen specimens (No. 38,180); and at station 2096, N. lat. 39° 22′ 20″, W. long. 70° 52′ 20″, in 1451 fathoms, forty-five dead specimens (No. 34,782).

Yoldia hyperborea Torell.

Torell, Spitzbergens Molluskfauna, p. 149, pl. 2, figs. 6, *a–b*, 1859.

Yoldia limatula G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 40, pl. 4, figs. 12, *a–b*, 1878 (*non* Say).

This species is closely allied to *Yoldia limatula* and *Yoldia myalis*, but is evidently distinct from both. Hitherto it has not been recognized as an inhabitant of the American coast, but it is not uncommon off the coast of Nova Scotia.

It was dredged by the U. S. Fish Commission at station 55, in 33 fathoms; stations 61–63 and 63–67, in 20–41 fathoms, 1877.

Yoldia sericea Jeffreys, var. striolata J.

Jeffreys, Mollusca Valorous Expd., Ann. Mag. Nat. Hist., 1876, p. 432; Proc. Zool. Soc. London, for 1879, p. 579, pl. 46, fig. 1.

This species occurred at stations 2035, 2037, 2041, 2042, 2043, 2052, 2076, 2084, 2096, 2103, 2106, 2110, 2111, 2115, in 516 to 1731 fathoms. It occurred in greatest abundance at station 2076, N. lat. 41° 13′, W. long. 66° 00′ 50″, in 906 fathoms, one hundred and sixty

specimens (No. 35,148); station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms, seventy specimens (No. 34,862); and at station 2115, off Cape Hatteras, N. lat. 35° 49′ 30″, W. long. 74° 34′ 45″, in 842 fathoms, fifty living specimens (No. 35,581).

It is recorded by Jeffreys, off the coast of Ireland, in 1366 to 1380 fathoms; off the coast of Portugal, in 740 to 1095 fathoms; and from the "Valorous Expedition," at station 12, in 1450 fathoms.

Our specimens are regularly concentrically sculptured with narrow grooves and raised lines. They agree closely with specimens labeled as *var. striolata*, in Mr. Jeffreys' collection, at the National Museum, with which I have compared them. They also resemble some of the varieties of *Y. pusio*.

Yoldia messanensis (Seguenza.) Variety.

Leda acuminata Jeffreys, Ann. Mag. Nat. Hist., July, 1870, p. 69 (*non* Von Buch).
Seguenza, Nuculidi terziarie merid. d'Ital., R. Acad. Lincei, 1877, p. 1175, pl. 3, figs. 15, 15*a*, 15*e*.
Leda messanensis Jeffreys, Proc. Zool. Soc. London, for 1879, p. 576.

The specimens referred to this species most resemble the variety *brevirostris* Seguenza, and differ considerably from the typical form. Our specimens are small, broad-ovate, rather thick and swollen, with the beaks nearly central and a little prominent. The posterior end is somewhat acute, though blunt at tip, and a distinct, rounded ridge runs from the beaks to the posterior extremity, and just in front of this there is a distinct inflection of the surface and ventral margin, without definite boundaries; the rest of the ventral margin is evenly rounded and the anterior end is obtuse and regularly curved. On the posterior dorsal margin, above the extreme tip, there is a slight, rounded angle, and from thence to the beak the outline is nearly straight. The anterior dorsal margin is convex. The surface, when fresh, is somewhat lustrous and iridescent, and covered with a pale yellowish epidermis. The sculpture generally consists of very fine concentric lines of growth, but in some specimens there are, toward the margin, distinct concentric grooves and ridges, the grooves being shallow, concave, with the ridges much narrower. The hinge-margin is wide and strong, with large and broad teeth, of which there are about nine on each side of the center; the cartilage-pit is very small.

Length, 4^{mm}; ventral margin to beak, 3^{mm}.

Station 2038, in 2033 fathoms (No. 35,212), two dead; station 2041, in 1608 fathoms; station 2042, in 1555 fathoms; station 2043,

in 1467 fathoms, two living and three dead (No. 38,209); and station 2096, in 1451 fathoms, one dead (No. 38,211).

This species has been taken at numerous localities off the European coast by the Valorous, Porcupine and other expeditions, and between the Azores and Bermudas by the Challenger Expedition; its range being from 100 to 1750 fathoms.

It was also taken in the West Indies and Gulf of Mexico by the Blake Expeditions, in 100 to 1002 fathoms, according to Mr. Dall. It is also found in the Pliocene of southern Italy.

The specimens from the Blake Expedition, which I have examined, are much more acutely pointed posteriorly, and have much stronger concentric striations than our examples. It is quite possible that the two forms are not identical.

Yoldia regularis Verrill, sp. nov.

Shell small, nearly regularly oval, with both ends obtusely rounded, and with the ventral edge broadly and regularly curved. The posterior end is a little narrower and more tapered than the anterior. The posterior dorsal margin is convex and rounded about as much as the ventral edge. The anterior dorsal margin is distinctly concave in front of the beak, but there is no defined lunule. The umbos are somewhat prominent, of moderate size, and curved forward. The beak is situated at about the anterior third. The surface is smooth, polished and iridescent, without any sculpture except slight and irregular lines of growth. Epidermis is thin and yellowish white. The hinge-margin is rather strong and curved, the posterior portion much longer than the anterior, and bearing about eight rather large and stout, prominent teeth. The anterior portion is short and nearly straight, and bears four or five prominent, erect teeth, the last tooth situated only a short distance from the beak. The cartilage-pit is relatively large and oblique and extends back a little ways from the beak.

Length, 3·5^{mm}; height, 2·5^{mm}.

Station 1093, off Martha's Vineyard, in 349 fathoms, 1882. Three specimens (No. 38,420).

This small species differs from all others recognized from our coast in its very regular ovate form, with the beak directed anteriorly, so that it resembles externally a minute *Tapes* or *Mactra*, or a compressed species of *Callista*. It is also remarkable for the shortness of the anterior hinge-margin and the small number of anterior teeth, as well as for the unusually large cartilage-pit.

Yoldia subequilatera (Jeffreys.)

Leda subequilatera Jeffreys, Proc. Zool. Soc. London, for 1879, p. 579, pl. 46, fig. 3.

Station 2037, in 1731 fathoms, eight living specimens (No. 35,201); station 2078, in 499 fathoms, twenty-five living specimens (No. 35,138); and station 2115, off Cape Hatteras, in 843 fathoms, one dead specimen (No. 38,191).

It has been taken by the Lightning, Porcupine, and Norwegian Expeditions, in 459 to 778 fathoms, and off the Azores, in 1622 fathoms, by the Talisman Expedition.

Yoldia Jeffreysii (Hidalgo.)

Leda lata Jeffreys, Ann. Mag. Nat. Hist., Nov. 1876, p. 431.
Leda Jeffreysi Jeffreys, Proc. Zool. Soc. London, for 1879, p. 579, pl. 46, fig. 2.

Station 1093, in 349 fathoms, 1882; and station 2084, in 1290 fathoms, 1883, several fresh specimens (No. 38,415).

It has been taken at numerous localities off the coast of Europe, and between the Azores and Bermudas, at depths ranging from 452 to 2199 fathoms.

Our specimens are not full grown and have the hinge plate light and thin, with very slender teeth, but in other respects they agree well with Mr. Jeffreys' original specimens, with which I have compared them at the National Museum.

Leda Bushiana Verrill, sp. nov.

Shell narrow-lanceolate in form, compressed, with the front end simple and bluntly rounded, much shorter than the posterior end, which tapers gradually and ends in a narrow, truncated tip, which is not upturned, or but very slightly so. The umbos are a little prominent and rather sharp. From the apex two rounded ridges run to the posterior end; the lower one, running to the lower angle of the tip, is pretty strongly marked, and causes a slight undulation of the surface and of the margin below it. The posterior dorsal margin is compressed, rising in the form of a sharp, smooth keel, which has usually a slightly convex outline. The dorsal area is pretty clearly separated from the rest of the surface by the upper angular ridge running from the beak. In front of the beak there is a small but pretty well defined lunule. The surface, in all but one specimen, is covered with rather strong, sharply defined, raised concentric lamellæ, which are separated by concave intervals of variable width, those towards the umbos being narrower than those near the margin. The

lamellæ in crossing the lower posterior ridge become a little more prominent, or form small crests, but fade out at the upper ridge. In one specimen, which does not differ in other respects, the sculpture is much more feeble, consisting of very numerous fine and close concentric lines, which are but little elevated, but some of these, at variable distances apart, are a little stronger than the rest; the posterior ridges are also nearly obsolete. The epidermis is thin, closely adherent, light yellowish green. The interior surface is bluish white and lustrous, the concentric ribs showing through by translucency. The teeth are prominent, sharp, rather slender, strongly compressed, and connected by a thin, well marked ridge along the inner edge. The anterior hinge-margin is gently curved, and bears, in the larger specimens, about twelve well-formed teeth, besides four or five minute ones close to the cartilage. Just in front of the small triangular cartilage-pit, a small, somewhat prominent, obtuse tooth is developed on the inner surface of the hinge-margin. The posterior hinge-margin is decidedly longer than the anterior, nearly straight, and bears about fifteen distinct teeth, besides a few minute ones close to the cartilage-pit. A distinct ridge runs from the beak to the lower angle of the posterior tip.

Length of the largest example, 15^{mm}; height, from ventral margin to beak, 7^{mm}; from beak to anterior margin, 6^{mm}; from beak to posterior end, 10^{mm}.

Station 2110, off Cape Hatteras, in 516 fathoms (No. 35,729).

This species somewhat resembles, in size and form, *L. tenuisulcata* and *L. minuta*, but it is a thinner, more compressed, and more delicate shell, and is quite distinct in its sculpture and in the structure of the hinge.

Phaseolus ovatus? (Jeff. MSS.)

Seguenza, Nuculidi terz. mer. Italia, R. Accad. Lincei, Ser. III, vol. i, p. 1182, pl. V, fig. 29–29*c*, 1877.

Station 2084, in 1290 fathoms, six living specimens.

Our specimens are small and shaped nearly like *Yoldia Jeffreysii*, with a smooth, lustrous, iridescent surface and yellowish green epidermis. The hinge-margin is thin, with a few very oblique and appressed, low, feeble teeth, three or four in front and four or five behind the small cartilage-pit. Its identification is doubtful.

Nucula cancellata Jeffreys.

Nucula reticulata Jeffreys, Ann. Mag. Nat. Hist., 1876, p. 429; Proc. Zool. Soc. London, for 1879, p. 583, pl. 46, fig. 7, (name preoccupied by Hinds).
Nucula cancellata Jeffreys, Proc. Zool. Soc. London, for 1881, p. 951.

This species occurred in great abundance at station 2076, N. lat. 41° 13′, W. long. 66° 00′ 50″, in 906 fathoms (No. 34,765), and station 2084, N. lat. 40° 16′ 50″, W. long. 67° 05′ 15″, in 1290 fathoms (No. 34,860), one thousand specimens, living. It also occurred in less numbers at stations 2035, in 1362 fathoms; 2037, in 1731 fathoms; 2038, in 2033 fathoms; 2043, in 1467 fathoms, 2052, in 1098 fathoms; 2072, in 858 fathoms (one dead); 2096, in 1451 fathoms; 2102, in 1209 fathoms; 2103, in 1091 fathoms.

Off the European coast, it was taken by the Porcupine and Valorous Expeditions, in 420 to 1470 fathoms, and by the Challenger Expedition, off the Azores, in 1000 to 1100 fathoms.

Glomus nitens Jeffreys.

Jeffreys, Mollusca Valorous Exped., Ann. Mag. Nat. Hist., 1876, p. 433; Proc. Zool. Soc. London, for 1879, p. 573, pl. 45, fig. 5.

Station 2041, N. lat. 39° 22′ 50″, W. long. 68° 25′, in 1608 fathoms, one dead specimen.

This species was taken by the Porcupine Expedition, in the North Sea, in 567 fathoms; off the coast of Ireland, in 1180 to 1476 fathoms, and at station 9, in 1750 fathoms.

Limopsis cristata Jeffreys.

Jeffreys, Ann. Mag. Nat. Hist., Nov. 1876, p. 434; Proc. Zool. Soc. London, for 1879, p. 585, pl. 46, fig. 8.

Station 2048, N. lat. 40° 02′, W. long. 68° 50′ 30″, in 547 fathoms, two valves.

These specimens have been compared by me with types in the collection of Mr. Jeffreys at the National Museum. They appear to agree in all the essential characters.

It was taken, off the coast of Europe, by the Porcupine and Valorous Expeditions, in 292 to 1095 fathoms; and by Travailleur Expedition, in the Bay of Biscay, in 341 to 1693 fathoms.

Limopsis tenella Jeffreys.

Jeffreys, Ann. Mag. Nat. Hist., Nov. 1876, p. 433.

Station 2037, N. lat. 38° 53′, W. long. 69° 23′ 30″, in 1731 fathoms; and 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms.

I have compared these specimens with types in Mr. Jeffreys' collection at the National Museum.

It was first taken by the Valorous Expedition, in 1450 fathoms.

Pecten leptaleus Verrill, sp. nov.

Shell small, thin, delicate, well rounded, resembling *P. pustulosus* in form, but with much finer sculpture. The umbos small, pointed. The anterior ear is prominent with a rather deep, rounded notch in the upper valve and a narrower and deeper notch in the lower valve; the posterior ear is small and short. The sculpture on the upper valve consists of numerous, thin, rather close, concentric riblets which become fewer and less elevated toward the umbos of which the most prominent part is nearly smooth; these concentric lines continue over the ears, becoming quite prominent on the anterior ear, but fine and close on the posterior one. The intervals between the concentric lamellæ are crossed by numerous, very thin, raised lines which become obsolete on the umbos, and nearly so on the anterior ear. These radiating lines in crossing the concentric lamellæ form minute, rounded granules which are most distinct on those near the margin, where they are very numerous, appearing like strings of minute beads along the lamellæ. The lower valve is smaller and less convex than the upper, with the outer portion of its margin bent downward. The sculpture consists only of a very fine, close, concentric lines, except on the ears which are covered with numerous, close, radiating lines, which are roughened by the concentric lines. Color yellowish white.

Length, 7^{mm}; height from ventral margin to dorsal edge, $6{\cdot}5^{mm}$; length of dorsal margin, 4^{mm}.

Two specimens were taken, off Cape Hatteras, at station 2109, in 142 fathoms (No. 38,413).

Pecten fragilis Jeffreys.

Jeffreys, Ann. Mag. Nat. Hist., Nov., 1876, p. 424; Proc. Zool. Soc. London, for 1879, p. 561, pl. 45, fig. 1.

Station 2115, off Cape Hatteras, in 843 fathoms, two specimens (No. 35,566).

It has been taken off the European coast by the Porcupine and Valorous Expeditions, in 1450 to 1750 fathoms; and by the Norwegian Arctic Expedition, in 656 to 1353 fathoms.

Pecten striatus Müller.

Müller, Zool. Dan. Prodr., No. 2994 (t. Jeffreys).
Jeffreys, Brit. Conch., vol. ii, p. 69; vol. v, p. 168, pl. 23, fig. 4.

One valve, which has been identified as this species by Mr. Dall, occurred off Martha's Vineyard, at station 949, in 100 fathoms, 1881 (No. 38,179). No other similar specimen has been taken by us.

Avicula squamulosa? Lam.

A small *Avicula*, taken alive at the surface at station 2099 (No. 34,781), is referred to this species with some doubt. The shell is rather broad and rounded for the genus, and but little oblique. The tail (cauda) is almost obsolete, forming only a slightly prominent angle, shorter than the body of the shell, and separated from it only by a slight emargination. The anterior auricle is small and rounded. The byssal notch is narrow and moderately deep. The body of the shell is ornamented with from twelve to fourteen radiating rows of long, narrow and slender scales, which are transversely banded with purple and white. The lines of growth are slightly lamellose toward the margin and the whole surface appears under a lens to be minutely punctate. The color is light yellow, becoming white on the umbos, and irregularly and concentrically streaked with reddish brown. The lower valve is concave toward the margin, but has scales and coloration similar to the upper valve.

Total length, 15^{mm}; length of hinge line, 12^{mm}; height from the ventral to dorsal margin, 11^{mm}.

BRACHIOPODA.

Discina Atlantica King.

King, Proc. Nat. Hist. Soc. Dublin, 1868, vol. v, p. 170.
Jeffreys, Ann. Mag. Nat. Hist. for 1876, p. 252; Proc. Geol. Soc. London, for 1878, p. 415, pl. 23, fig. 7.

Several specimens of this species were taken by the Albatross in 1883. I have identified these with specimens in Mr. Jeffreys' collection, now in the U. S. National Museum.

Station 2043, in 1467 fathoms, two specimens (No. 38,429); station 2096, in 1251 fathoms, ten specimens (No. 35,170).

According to Jeffreys, this species has been taken off the European coast, in 690 to 1450 fathoms. North Atlantic, on telegraph cable, in 2400 fathoms; near St. Paul Island, in 1850 fathoms; off Bermuda, in 2180 fathoms; and in the North Pacific, in 1875 and 2050 fathoms; off the coast of North Australia, in 200 to 1400 fathoms (Challenger Expedition).

Waldheimia cranium (Müller) Davidson.

Terebratula cranium Müller, Zool. Dan. Prodr., p. 249, 1776.
Jeffreys, Brit. Conch., vol. ii, p. 11; vol. v, p. 163, pl. 19, fig. 1, 1*a*; Proc. Zool. Soc. London, for 1878, p. 405.
Waldheimia cranium Friele, The Development of the Skeleton in the Genus Waldheimia, in Archiv. Math. Naturvid., pp. 380–386, pls. 1–3, 1877.

A single living specimen, which Mr. W. H. Dall has identified as this species, was taken by the Albatross, at station 2035, off Martha's Vineyard, in 1362 fathoms. When first taken it was supposed to belong to *W. tenera* Jeffreys. No authentic instance of the occurrence of this species on the N. American coast has been recorded. On the coast of Europe it is not uncommon in 30 to 700 fathoms, and ranges from Norway to France. It has also been recorded from Greenland, Northern Asia and Japan.

The following two species have not yet been taken south of Labrador, but may be regarded as belonging to the North American fauna.

Waldheimia tenera (Jeffreys).

Terebratula tenera Jeffreys, Ann. Mag. Nat. Hist., Sept., 1876, p. 250; Proc. Zool. Soc. London, for 1878, p. 405, pl. 22, fig. 7.

This species was taken by the Valorous Expedition, far off the coast of Labrador, in 1450 fathoms, N. lat. 56° 11′, W. long. 37° 41′. It has not yet been recorded from any other locality, but is likely to occur off our coast at similar depths.

Atretia gnomon Jeffreys.

Ann. Mag. Nat. Hist., Sept., 1876, p. 251; Proc. Zool. Soc. London, for 1878, p. 412, pl. 23, fig. 4.

This species was recorded by Jeffreys, from off the coast of northern Labrador, N. lat. 59° 10′, W. long. 50° 25′, in 1750 fathoms, and also from N. lat. 56° 11′, W. long. 37° 41′, in 1450 fathoms.

On the European coast it has been taken, according to Jeffreys, at several localities, in 650 to 1750 fathoms, and off Marocco and the Azores, in 1192 to 2199 fathoms.

Addenda.

After the preceding pages were mostly in type, an additional lot of mollusca, dredged in 1883, by the Albatross, mostly from off Cape Hatteras, was received from the National Museum. It contained many additions to the list. A few of the most important ones are here included.

Octopus Carolinensis Verrill, sp. nov.

Body, in the alcoholic specimen, rather small, somewhat oblong, obtusely rounded posteriorly and slightly emarginate beneath. Head large, and with the basal web larger than the body. Eyes large and prominent, occupying nearly the whole of the sides of the head, and in contact, or nearly so, dorsally. Entire surface of the body, head and upper surface of the umbrella and arms covered with minute but prominent verrucæ, which are somewhat larger and more crowded on the back than beneath. There are no cirri on the back nor above the eyes, but the upper eyelid is covered with small verrucæ like those of the back, and is marked with radiating wrinkles. Siphon moderately long and rather slender. Arms angular, long, slender; the two lateral pairs about equal in length; the ventral and dorsal pairs about equal in length and slightly shorter than the lateral; the ventral arms are a trifle longer than the dorsal and appear to have the suckers a little larger. The web is more than one-fourth the length of the dorsal arms, and extends farther out between the lateral arms than between the ventral or dorsal. A rather wide marginal membrane runs along the arms, even to the tips; it is most developed on the lower side of the lateral arms. The suckers are moderately large, rather closely arranged in two regular rows, and diminish very regularly from near the base to the very slender tips of the arms.

Length of body, 22^{mm}; its breadth, 20^{mm}; breadth of the head, the same; length from the posterior end of the body to edge of web between dorsal arms, 45^{mm}; length of dorsal arms from mouth, 64^{mm}; of 2d pair, 72^{mm}; of 3d pair, 70^{mm}; of 4th pair, 66^{mm}; diameter of dorsal and lateral arms, $4{\cdot}5^{mm}$; diameter of largest suckers, 2^{mm}.

Color, in alcohol, rather dark purplish brown above, due to abundant, closely crowded, minute chromatophores; lower surface, yellowish white, rather thickly specked with orange and brown chromatophores. Inner surface of arms, suckers and eyelids white.

Station 2109, off Cape Hatteras, in 142 fathoms (No. 35,673). One female.

Octopus gracilis Verrill, sp. nov.

Size of our only specimen small. Body slender, elongated, broadest just back of the gill openings, obtusely rounded posteriorly. Whole surface, above and beneath, smooth, with neither cirri nor verrucæ. Head moderately large. Eyes rather large and prominent, with smooth lids. Umbrella small, the web extending only a short distance and about equally between the dorsal and lateral arms. Arms very slender, elongated, tapering to very thin tips, the third pair much longer than the two upper pairs, but all of about the same thickness at base. The dorsal arms are not half the length of the third pair; the second pair is but little longer than the dorsal and about the same in thickness; the ventral arms are both broken off near the base. The suckers are small and diminish very regularly from the base to the tip of the arms. Those on the two lower pairs of arms are rather more openly arranged, the spaces between the consecutive suckers being about double that on the upper arms, while the two rows are closer together; on each of these arms three to five of the suckers near the base stand nearly in a median line, which is not the case on the upper pairs of arms.

Length of body, 11^{mm}; greatest breadth, 7^{mm}; breadth of head, 6·5^{mm}; from posterior end of body to edge of web between the arms, 17^{mm}; length of dorsal arms from mouth, 19^{mm}; diameter near base, 1·3^{mm}; length of 2nd pair, 21^{mm}; length of 3rd pair, 42^{mm}.

Color, in alcohol, yellowish white, covered with large purplish brown chromatophores, darkest on the upper surface of the head, between the eyes. Inner surface of the arms and suckers yellowish white with a purplish spot in front and behind the base of each sucker.

Station 2084, in 1290 fathoms, one specimen, female (No. 38,431).

This specimen is probably young of a species that grows to a larger size. It differs, however, from all described species in the remarkable elongation of the third pair of arms compared with the first and second pairs; all the arms are also remarkably slender, and the body is peculiarly elongated and smooth. It is very certain that it is not the young of any of the known species.

Bela Rathbuni Verrill, sp. nov.

Shell large, rather stout, sub-fusiform, with an elevated acute spire, forming more than half the total length of the shell. Whorls seven besides the nucleus, moderately convex, with an impressed, not very oblique suture. The whorls of the spire are pretty strongly angulated or carinated a little above the middle by a revolving

carina, which appears double at the summit, and slightly nodulous where it is crossed by the longitudinal lines. Above the carina there is a rather wide, sloping, flattened or slightly concave subsutural band, which is crossed by somewhat raised, moderately excurved lamellæ, parallel with the lines of growth and with the sinus in the lip; there is also a rather faint revolving cingulus a little below the middle of the band. Below the principal carina there is a rather wide concave interspace, which surrounds the middle or most prominent part of the whorls, and is bounded below by a carina like the upper one, but not quite so strong; anterior to this there are, on the body-whorl and siphon, numerous similar double revolving cinguli, decreasing in size and becoming closer anteriorly; of these there are about twelve above the base of the siphon; the concave interspaces between the upper ones are about equal in width to the cinguli. The whole surface is covered by numerous slightly raised, longitudinal lines, which are parallel with the lines of growth and are most conspicuous in the interspaces between the cinguli. The apex, in our single specimen, is badly eroded. The aperture is narrow-ovate, not very large, with a distinct obtuse angle at the base of the columella, which is rather short and nearly straight. The siphon is short and straight, distinguished from the body-whorl only by a slight undulation. The canal is short, straight and rather open.

Length, without the nuclear whorls, 27^{mm}; breadth, 13^{mm}; length of aperture, 13^{mm}; its breadth, 5^{mm}.

Station 2105, off Chesapeake Bay, in 1395 fathoms (No. 35,704), one dead specimen.

The single specimen of this species is considerably eroded, so that the sculpture, especially the longitudinal lines, appears more strongly marked than it would in a fresh specimen. Perhaps the double character of the revolving carinæ is more obvious for the same reason. They may originally have been more elevated and sharper. The species bears but little resemblance to any other known from our coast, but the character of the sculpture is not unlike *B. bicarinata*, but the largest specimens of the latter are pygmies, in comparison with the present species.

Urosalpinx Carolinensis Verrill, sp. nov.

Shell small, pretty regularly fusiform, with an elevated, rather acute spire, which forms nearly one-half the total length of the shell. Whorls six to seven moderately convex, with an impressed suture. The sculpture consists of about twelve rather prominent, stout longi-

tudinal ribs, which run nearly straight across the whorls, and on the last whorl extend to the base of the siphon; these are separated by deeply concave intervals of about the same width. The whole surface is covered by strongly marked revolving cinguli, which cross both the ribs and their interspaces, and thicken so as to form small, rounded nodules where they cross the ribs; these are separated by interspaces of about the same width, in the middle of which there is a much smaller, thin revolving cingulus, alternating pretty regularly with the larger ones around the periphery. On the anterior part of the body-whorl, and sometimes at the periphery, there are two or three small revolving cinguli in some of the interspaces. On the penultimate whorl there are usually five to seven of the primary cinguli, and on the body-whorl and siphon there are about eighteen to twenty. The whole surface is also covered, in perfect specimens, with fine, slightly elevated, wavy lines of growth, which are most conspicuous on the intervals between the ribs; they are usually worn off from the more prominent parts of the ribs and nodules. The nucleus consists of about two and one half regularly coiled whorls; the first two are small, smooth, translucent and somewhat lustrous; the last is covered with rather faint revolving lines, crossed by the lines of growth, which gradually merge into the longitudinal sculpture of the normal whorls, there being no very distinct demarcation between the nucleus and the next whorl. The apical whorl is minute, regularly increasing. Aperture elongated, ovate-fusiform; outer lip thin, sharp, regularly curved; inner margin regularly arched. Collumella somewhat elongated, its margin sinuous and somewhat excurved at the tip. Canal narrow and somewhat elongated, a little curved. Color bluish white. Epidermis very thin, pale grayish or yellowish white.

Length of one of the largest specimens, 15^{mm}; breadth, 7^{mm}; length of aperture, 8^{mm}; its breadth, 3^{mm}.

This species was taken, off Cape Hatteras, at station 2109, in 142 fathoms, in considerable abundance (No. 35,735); station 2110, in 516 fathoms (one dead); and station 2111, in 938 fathoms, one living (No. 35,764). Possibly the two latter specimens may be due to accidental misplacement.

This species bears considerable general resemblance to the shallow-water species (*C. cinerea*), but it is a much smaller and more slender species, with a narrower aperture and longer canal. The sculpture is more simple, there being usually but two sets of revolving cinguli, the larger and smaller ones alternating pretty regularly.

Urosalpinx macra Verrill, sp. nov.

The shell is nearly regularly fusiform, consisting of seven whorls, separated by an impressed suture. The spire is somewhat elongated, regularly tapered, and forms one-half the length of the shell. The nucleus is mamilliform, consisting of about two regularly coiled, convex, rounded whorls, of which the first is nearly as large as the second. The lower whorls are crossed by about ten broad, strongly marked, nodulous ribs. The spiral sculpture consists of stout, rounded, rather elevated, revolving cinguli, which rise into oblong nodules or tubercles in crossing the ribs; of these there are about eight on the body-whorl, besides five or six on the siphon without nodules. On the penultimate whorl there are five or six primary cinguli, of which two or three around the periphery are considerably larger and farther apart than the others; one, below these, is coincident with the suture and makes it undulating. Between the primary cinguli there are three to five much smaller rounded cinguli, separated by thin, incised grooves; these cinguli are about equally prominent on the ribs and interspaces and do not form nodules. The surface is also covered with fine, close, raised lines of growth, except on the nodules, which are smooth at summit. The aperture is ovate, continued anteriorly in a rather long, narrow canal, and having a slight posterior notch or sinus at the suture. The outer lip is sharp and regularly arched; the inner lip is strongly excavated, its curvature posteriorly being greater than that of the outer lip. Columella rather elongated, straight, with a somewhat sinuous inner margin. The canal is straight, somewhat elongated and constricted. Color yellowish white; interior grayish white.

Length, 13^{mm}; breadth, $5{\cdot}5^{mm}$; length of aperture, $7{\cdot}5^{mm}$; its greatest breadth, $2{\cdot}5^{mm}$.

Off Cape Hatteras, station 2109, in 142 fathoms (No. 35,772), one fresh specimen.

Sipho hispidulus Verrill, sp. nov.

Shell small, short, broad-ovate, with a rather short, bluntly tapered spire, obtusely rounded at the tip, and with a swollen body-whorl, constituting the greater part of the shell. Whorls four, rapidly enlarging, convex, with a distinctly carinate, angular shoulder above the middle, above which there is a concave subsutural band, separated from the suture by an angular, interrupted revolving ridge, next the suture. Besides these two nodose, revolving carinæ, there

are two additional ones, nearly as strong, around the periphery, and one or two faint ones on the subsutural band. On the last whorl there are eight or nine revolving carinæ below the shoulder, besides six or seven on the siphon. The longitudinal sculpture consists of numerous, rather narrow, angular, longitudinal ribs, which run nearly straight across the whorls, parallel with the lines of growth, which are rather conspicuous, distinctly raised and lamelliform, covering both the ribs and their interspaces. The ribs in crossing the revolving carinæ form small, rounded or subconical nodules, of which those on the shoulder and on the sutural carina are the most prominent and most compressed. The ribs are continued across the subsutural band, on the lower whorls, in the form of thin, raised lamellæ, somewhat larger than the intervening lines of growth; but on the upper whorls the ribs, across the entire breadth, are thin, lamelliform, and bent forward, rising in the form of small angles in crossing the revolving cinguli. The surface is covered by a closely adherent epidermis, which bears minute, sparsely scattered hairs, especially along the summits of the revolving cinguli. The nucleus is minute, regularly coiled, depressed, and largely covered by the succeeding whorl. The first or apical whorl is smooth and translucent, but on the second the normal sculpture is gradually developed. The aperture is rather broad-ovate, more than half the length of the shell. Columella is straight, with a strongly sinuous inner margin. The canal is rather short and broad, not constricted. The operculum is thin, yellowish white, translucent, ovate, somewhat pointed posteriorly, and slightly truncated on the posterior part of the outer margin; the nucleus is at the extreme posterior tip. Color of the shell white, with a pale flesh-colored tint on the spire.

Length, 7·5^{mm}; breadth, 4^{mm}; length of aperture, 5^{mm}; its breadth, 2^{mm}.

Station 2038, N. lat. 38° 30′ 30″, W. long. 69° 08′ 25″, in 2033 fathoms, one living specimen (No. 34,840).

The generic relations of this shell are somewhat doubtful. In general appearance and sculpture it resembles certain species of *Bela*, but the character of the nucleus and the hairy epidermis, together with the character of the operculum, indicate that it belongs to or near *Sipho*. This is also indicated by the fact that there is no distinct sinus in the outer lip, nor are the lines of growth distinctly excurved in crossing the subsutural band. In size and shape the shell resembles *Bela hebes* and *Gymnobela curta*, var. *angulata*, from both of which it differs decidedly in sculpture. The specimen described may, however, be the young of a much larger species.

Cingula Sandersoni Verrill, sp. nov.

Shell moderately large for the genus, thin, fragile, long-ovate, with a rather tall, somewhat turreted, acute spire. Whorls six to seven, strongly and evenly convex, separated by a deep, impressed, simple suture. Body-whorl large, rather swollen, well rounded, and constituting more than one-half the length of the shell. Nuclear whorl small, smooth, somewhat prominent, regularly coiled. Base rather strongly produced, destitute of an umbilicus, but sometimes with a slight chink, produced by the everted edge of the inner lip. Aperture pretty regularly ovate, rather broad, obtusely rounded in front, and with the posterior end narrowed and sometimes forming a slight sutural sinus; outer lip thin and regularly curved; inner lip continuous, usually with a thin, free edge along the body-whorl. The sculpture consists of very fine, close revolving lines, visible with a lens, and of still finer, but usually distinct lines of growth, which interrupt, more or less, the spiral lines.

Color white in our specimens, all of which appear to have been dead when dredged.

Length, 4^{mm}; breadth, 2^{mm}; length of body-whorl, $2{\cdot}5^{mm}$; length of aperture, $1{\cdot}8^{mm}$. A large specimen, with broken apex, is $2{\cdot}7^{mm}$ broad; length of body-whorl $3{\cdot}5^{mm}$. Most of the specimens are smaller than those measured, and some are more slender in proportion.

Station 2109, off Cape Hatteras, in 142 fathoms, numerous specimens (No. 35,447).

In form, this species resembles *C. turricula* Lea, but the latter is described and figured as smooth and umbilicated. It is evidently allied to *C. aculeus*, but differs in its stouter form, deeper suture, and much finer sculpture. The sculpture is somewhat similar to that of *C. leptalea*, but the latter is very different in the form of the shell and aperture. Dedicated to Mr. Sanderson Smith, by whom it was dredged.

Rotella cryptospira Verrill, sp. nov.

Shell minute, strongly depressed, with the spire not at all elevated and mostly concealed by the overlaping of the last whorl. Surface smooth and polished, without any lines of growth. The last whorl constitutes nearly the entire shell, overlaping and nearly concealing the previous whorls, but sometimes leaving a slight central depression in which the minute spire is imperfectly visible. Base flattened or but slightly convex; the umbilical region is completely covered by a

small smooth callus. The aperture is oblique, nearly circular, encroached upon a little by the body-whorl. The lip is slightly thickened, with the margin rounded. In some specimens there is a slight, angular, posterior sinus, at the suture, and sometimes the inner lip is a little thickened in the umbilical region. Color of all our specimens white, but none of them appear to have been living, although many are fresh and have a polished surface.

Greatest diameter, 2·5^{mm}; height, 1·5^{mm}; diameter of the aperture, about 1^{mm}.

Off Cape Hatteras, station 2109, in 142 fathoms (No. 35,731), about thirty specimens.

This species bears some resemblance to *R. anomala* D'Orb., but is peculiar in having the whorls of the spire concealed, or nearly so, by the last whorl.

Ethalia multistriata Verrill, sp. nov.

Rotella striata? D'Orbigny, Moll. Cuba, atlas, pl. 18, figs. 29–31.

This shell, although resembling in most respects that figured by D'Orbigny, differs in being more depressed, with a lower spire and less prominent base. The spiral lines are much finer and more numerous, and the inner lip is distinctly thickened opposite the umbilicus.

Shell small, much depressed, with the spire rising but very little above the body-whorl, and with the base distinctly flattened. Whorls about three and one half, separated by a distinct and slightly impressed suture. The upper side of each whorl is depressed, but the periphery is very convex and obtusely rounded. The nuclear whorl is moderately large, smooth, translucent, and regularly coiled. The entire upper surface, below the nucleus, and most of the base, are covered by very numerous fine, impressed, revolving lines, with interspaces which are a little wider than the lines themselves. On the inner half of the base, around the umbilicus, the spiral lines are obsolete. Just below the suture there is a stronger groove or slight depression, defining a small, subsutural, slightly raised ridge. The surface is also covered with very fine, but distinct, impressed lines of growth, which, in crossing the spiral lines, give them a slightly wavy or punctate appearance, and sometimes produce a minute and feeble reticulated structure. The aperture is very oblique, broader than long, with the anterior border somewhat flattened, the outer side very convex, and with a slight, angular, posterior corner, or sutural sinus, below which the body-whorl projects slightly into the aperture,

while the columella-margin is regularly excurved. The inner lip is continued across the body-whorl in the form of a thin, closely adherent callus deposit; the columella-margin, in advance of the umbilicus, is distinctly thickened, but does not form a tooth, nor a distinct angle. The umbilicus is moderately large and deep, showing part of the whorls.

Height of the largest specimen, $2{\cdot}5^{mm}$; breadth, $4{\cdot}5^{mm}$; length of aperture, $1{\cdot}7^{mm}$; breadth, 2^{mm}.

Off Cape Hatteras, station 2109, in 142 fathoms, sixteen specimens, all dead, but fresh (No. 35,733).

This species resembles *Rotella striata* D'Orb. It is a much more depressed shell than he figures, and the spiral lines appear to be much more numerous and finer, nor does his figures show any distinct thickening of the columella-margin.

Notes on Species previously recorded.

Mastigoteuthis Agassizii Verrill.

Bull. Mus. Comp. Zool., vol. viii, p. 100, pl. 1, fig. 1; pl. 2, figs. 2, 3–3*e*, 1881.
These Transactions, vol. v, p. 297, pl. 47, pl. 49, figs. 2, 3–3*e*, 1881.

Additional specimens of this species were taken in 1883, at station 2050, in 1050 fathoms; station 2072, in 858 fathoms; station 2076, in 906 fathoms.

It had not previously been taken by the Fish Commission.

Chiroteuthis lacertosa Verrill.

These Transactions, vol. v, pages 299, 408, 450, pl. 47, figs. 1, 1*b*; pl. 56, figs. 1–1*f*.

Additional specimens of this species have been taken at station 2074, in 1309 fathoms; station 2098, in 2221 fathoms; station 2094, in 1022 fathoms, and mutilated arms from a fish stomach, from station 2099, in 2949 fathoms.

Calliteuthis reversa Verrill.

These Transactions, vol. v, p. 295, pl. 46, figs. 1–1*b*, 1881.

Additional specimens of this species were taken in 1883, at station 2034, in 1346 fathoms; station 2039, in 2369 fathoms; station 2041, in 1608 fathoms (head only); station 2076, in 906 fathoms.

The young specimen of this species, from station 2076, has one of the tentacular arms preserved. These arms have been absent in all the other specimens that I have examined, and seem to be very easily detached. In this example the tentacular arm is long, very slender,

being about twice the length of the sessile arms, and not half as thick at the base as the smallest of the sessile arms. The proximal half is strongly flattened, and tapers from the base outwardly. The distal half is much more slender and is somewhat angular or triquetral, becoming somewhat sub-cylindrical and very slender toward the club, which is well developed, narrow-lanceolate in form, somewhat expanded toward the base, and gradually tapered to the tip. The slender distal half of the arm bears a row of very small, rather distant, smooth edged, sessile suckers, alternating with minute tubercles on its inner surface; these are evidently intended, as in allied genera, for attaching the two arms together. Close to the base of the club, these sessile suckers become closer and more numerous. The club itself bears, on its broader, basal portion, about six rows of suckers. One row, which is nearly central, consists of about seven, rather broad, cup-shaped suckers, decidedly larger than any of the others, and of these, three central ones are decidedly the largest; their horny rings are very finely and sharply denticulate around the entire margin, which is but little oblique; just below the horny ring there is a constriction, and the body of the sucker is considerably swollen. Alternating with these are other similar, but smaller, suckers, forming a second median row; on each side of these are two marginal rows of still smaller and somewhat more oblique, cup-shaped suckers. The distal half of the club is crowdedly covered with numerous, small suckers, which are apparently arranged in six rows, and decrease gradually in size to the tip of the club, the number of rows apparently decreasing to four, and the size becoming very minute near the tip, which is very narrow, simple, and, in this specimen, strongly curled spirally. These tentacular arms differ in color from the rest of the arms, the inner surface being orange, the edges yellowish white, and the outer surface covered with definite orange-brown chromatophores, while the other arms are darker externally, owing to the much more crowded chromatophores, and are covered with prominent verrucæ, each of which is marked on one side with dark brown, while the tip is white; the inner surface of the sessile arms is deep brown, and the suckers are white at base, tinged with orange-brown near the margin. The general color of the body and head is like that of the outer surface of the arms, but as in the original specimen, the color is much deeper and the verrucæ more numerous on the ventral surface than above. The caudal fin is thin, translucent, and destitute of color, except close to the base, where there are a few orange-brown chromatophores. The lobes of the fin extend back

considerably beyond the end of the body on each side, but are united to its extreme tip, leaving a distinct notch beyond the end of the tail. Each half of the caudal fin, taken by itself, is somewhat triangular in form, with the angles rounded, or rather it is between semicircular and triangular, the length longitudinally being decidedly greater than the distance from the base to the lateral border.

The specimen above described is 27^{mm} long, from the end of the body to the front edge of mantle, above; length, from end of body to base of dorsal arms, 34^{mm}; breadth of body and head, 12^{mm}; breadth across caudal fin, 18^{mm}; length of caudal fin, 9^{mm}; length of third pair of arms, 20^{mm}; length of tentacular arm, 67^{mm}.

Brachioteuthis Beanii Verrill.

These Transactions, vol. v, p. 406, pl. 50, figs. 3–3*b*; pl. 56, figs. 2–2*a*, 1881.

An additional specimen, considerably mutilated and apparently from a fish stomach, was taken at station 2115, off Cape Hatteras, in 843 fathoms.

Desmoteuthis tenera Verrill.

These Transactions, vol. v, p. 412, pl. 55, figs. 2–2*d*; pl. 56, fig. 3, 1881.

An additional specimen of this species was obtained in 1883, at station 2034, in 1346 fathoms.

The original specimen was taken in 388 fathoms.

Rossia megaptera Verrill.

These Transactions, vol. v, p. 349, pl. 38, fig. 1; pl. 46, fig. 6, 1881.

Body large, stout, swollen, well rounded posteriorly, longer than broad; integument entirely smooth and soft, but not flabby; fins large, not very prominent, most so in front of the center, thick, soft, and fleshy, colored like the body; the line of attachment extends from near the front edge of the mantle to about the posterior fifth of the body, the anterior end being more dorsal than the posterior; the front end of the fin is free at base and projects forward considerably beyond the edge of the mantle in a broad, rounded lobe; the outer edge of the fin forms a very broad, even curve, narrowing backward and closely adherent to the body posteriorly. The front dorsal edge of the mantle extends forward in the middle region in a very obtuse angle, and receding in a broad, sinuous curve behind the eyes, it advances again below the eyes, and recedes to form a broad ventral notch below the siphon. The head is very large, as broad as

the body, or even broader, with very large prominent eyes; lower lid prominent, a little everted, not much thickened; pupils large, surrounded with a black circle in the preserved specimen. Siphon large, stout at base, rapidly tapering to a small tip. The basal web between the arms is short, extending farthest between the 3d and 4th pairs of arms. The arms are rather large, stout, well-rounded externally; those of the 3d and 4th pairs are larger than the others; the 1st and 2d pairs nearly equal; all the arms bear two crowded rows of suckers, which are similar in size and arrangement on all the arms, and decrease regularly to the tips. These suckers are moderately large, oblong, very oblique, with a very small orifice; the suckers are thickly specked with small chromatophores, except on the under surface. Alternating with the suckers, on each side there are rather large, fleshy, triangular, oblique, marginal lobes, the acute inner ends running in between the suckers. The tentacular arms are large, rather long and stout, but more slender than the other arms, triquetral, with rounded corners, and nearly destitute of chromatophores; the terminal club is scarcely as wide as the rest of the arm, rather long, narrow-lanceolate in form, tapering to a blunt tip; along the upper margin of the arm, opposite the commencement of the suckers, but well separated from them, there is a sharp, elevated crest or keel, which does not extend to the tip of the arm; the suckers are very small, much smaller than those of the sessile arms, cup-shaped, nearly equal, very numerous, forming eight or more indistinct, crowded rows.

The color is nearly the same over all parts of the body, head and outer surfaces of the sessile arms, except on the lower surface of the head around the base of the siphon, where it is paler. This color in alcoholic specimens is dark brownish purple, due to large numbers of rather large irregular chromatophores scattered on a yellowish white ground-color. The surface in many parts, especially around the eyes and on the dorsal surface of the body, has a glaucous blue tint; the under surface of the head, around the siphon, the tip of the siphon, and the inner surfaces of the arms and suckers are yellowish white, with small scattered chromatophores, which become more numerous on the exposed surfaces of the suckers; outer surfaces of the arms like the body. The tentacular arms throughout are yellowish white, with the exception of a few scattered chromatophores on the outer surface.

Measurements.

Length to end of sessile arms	123m.	Length of dorsal arms	43m.
Length of body	52	Length of 2d pair	45
Length of head to base of dorsal arms	24	Length of 3d pair	50
Breadth across body and fins	76	Length of 4th pair	49
Breadth of body	40	Length of tentacular arms	75
Breadth of head	44	Length of club	18
Diameter of eyes	25	Breadth of club	4
Diameter of pupil	8	Diameter of tentacular arms	4 to 5
Length of fins, longitudinally	40	Diameter of largest suckers of sessile arms	1·5
Length of insertion of fins	35	Diameter of dorsal arms	6
Breadth of fins, transversely	18	Diameter of lateral arms	6·5
Insertion of fin to front edge of mantle	9	Diameter of largest suckers	2

Station 1124, in 640 fathoms, off Martha's Vineyard, 1882.

The only specimen previously known was from off Newfoundland, in about 150 fathoms, probably from a fish stomach.

Alloposus mollis Verrill.

American Journ. Sci., vol. xx, p. 394, 1880; these Transactions, vol. v, p. 366, pl. 50, figs. 1, 1*a*, 2, 2*a*, pl. 51, figs. 3, 4.

This species was taken by the Albatross, in 1883, at station 2034, in 1346 fathoms, one young; station 2036, in 1735 fathoms, fragments; station 2037, in 1731 fathoms (one arm).

At station 2034, in 1346 fathoms, a very young female specimen of this species was taken by the Albatross in 1883. In form and general appearance it differs but little from the large specimens described and figured by me. But the body is relatively shorter and broader, and the chromatophores are larger, more regularly scattered and more distinct.

Total length, 29mm; length of mantle beneath, 10mm; length of body and head to front side of eye, 17mm; breadth of body, 13mm.

Argonauta argo Linné.

Verrill, these Transactions, vol. v, pp. 364, 420.

PLATE XXVIII, FIGURES 1, 1*a*, 1*b*.

A young living specimen of this species was captured while swimming at the surface, about 100 miles south of the eastern end of Long Island, by Dr. Kite, surgeon of the Fish Hawk. From this specimen, after it had been in too strong alcohol for two or three days, the figures on Plate XXVIII were made. Owing to the strength of the

alcohol the expanded distal portion of the dorsal arms were very badly shriveled. The color of this example, in alcohol, was deep purplish brown above, paler beneath, the chromatophores being most crowded on the upper surface and having a tendency to be arranged so as to form small ocellated spots or circles, which, however, were not very distinct in the preserved specimen.

Octopus piscatorum Verrill.

American Journ. Sci., vol. xviii, p. 470, 1879; these Transactions, vol. v, p. 377, pl. 36, figs. 1, 2, 1881.

A good specimen of this species was taken by the Albatross at station 2035, in 1362 fathoms.

Previously all the specimens known had been received from the Gloucester fishermen, who had taken them on the banks off Nova Scotia and Newfoundland.

Eledone verrucosa Verrill.

Bull. Mus. Comp. Zool., vol. viii, p. 105, pls. 5 and 6, 1881; these Transactions, vol. v, p. 380, pls. 52 and 53, 1881.

A large male was taken by the Fish Hawk in 1882, at station 1123, off Nantucket, in 787 fathoms. It was taken in 1883 by the Albatross at station 2050, in 1050 fathoms; station 2051, in 1106 fathoms; station 2077, in 1255; station 2102, in 1209 fathoms.

The male, from station 1123, which is larger than the one originally described, had lost the left arms of the 1st and 2d pairs; the former was in process of being reproduced in the form of a small, conical, white process, with a small row of minute suckers.

The body, while still living, was provided with a fold of skin along the sides and around the posterior end; the back was covered with small papillæ, not very distinct while living, and not so large as in the original specimens. The arms were nearly smooth. The lower eyelid was papillose and dark purple in color. The web between the arms, while living, was broader than described in the original examples; the marginal membrane extended to the tips of the arms, and was broadest on the ventral side, so that the tips of the arms were strongly curled by the contraction of the membrane. The hectocotylized arm bears but thirty-nine suckers proximal to the modified tip; the papilla at the base of the modified tip is prominent, conical, with a white groove; the terminal appendage is crossed by about seven faint transverse folds. The color was dark purplish brown, with obscure roundish lighter spots on the dorsal

surface, mostly surrounding the verrucæ. Although still alive, when brought on deck, this specimen was, of course, much injured, and lived only for a short time.

Three of the specimens taken by the Albatross are smaller than any previously seen, but have the same general character as the large ones. In life the verrucæ showed but slightly.

Measurements of the large male specimen above described:

Total length	292mm	Length of hectocotylized arm	157
From tip of body to center of eye	78	Length of modified tip	11
Breadth of the body	75	Length of spoon-shaped organ	7
Breadth of head across the eyes	72	Length of ventral arms	197
Length of dorsal arms from mouth	235	Greatest breadth of the lateral arms	15
Length of 2nd pair of arms	250	Diameter of the largest sucker	5
Length of 3rd pair of arms (left side	222		

Stauroteuthis syrtensis Verrill.

American Journ. Sci., vol. xviii, p. 468, 1879; these Transactions, vol. v, p. 382, pl. 32, figs. 1–5, 1881.

The Albatross took a very young specimen of this remarkable species at station 2034, in 1346 fathoms.

The total length of this specimen is 21mm; length of head and body, 11mm; length of one of the fins, from base to tip, 9mm; from front to back edge, 3mm. In all essential characters this young specimen agrees well with the larger mutilated specimen originally described by me. The siphon and branchial opening have the same remarkable form and structure. The interbrachial membrane is nearly as broad as the length of the arms, and as a broad margin, extends to their tips.

The only specimen previously known was taken by the Gloucester fishermen, on Banquereau, off Nova Scotia, in about 250 fathoms.

Bela mitrula Lovén.

Bela concinnula Verrill, these Transactions, vol. v, p. 468, pl. 43, fig. 15; pl. 57, fig. 11.

Bela mitrula Bush, Proc. U. S. Nat. Mus., vol. vi, p. 237, 1883.

Dr. H. Friele has sent me typical specimens of *Bela mitrula* Lovén, from the coast of Norway, which appear to be perfectly identical with my *Bela concinnula*, var. *acuta*, which is found on the American coast from off Cape Cod to Labrador. Since the typical *concinnula* seems to be only a variety of the same species, it may be best to designate it as *Bela mitrula*, var. *concinnula*.

Bela Sarsii Verrill.

Verrill, these Transactions, vol. v, p. 484, 1881.
Bush, Proc. U. S. Nat. Mus., vol. vi, p. 237, pl. 9, fig. 8, 1883.

Miss Bush has recorded this species from Labrador, at Forteau Bay, L'anse au Loup, in 10 to 20 fathoms, and from Murray Bay, mouth of the St. Lawrence River.

These specimens agree well with those from the Norwegian coast.

This species is closely allied to *B. impressa* Mörch, from Spitzbergen.

Pleurotomella bandella (Dall).

Pleurotoma (*Mangilia*) *bandella* Dall, op. cit., p. 59, 1881.
Pleurotomella Diomedeæ Verrill, this volume, p. 152, 1884.

Plate XXXI, figures 5, 5*a*.

After the earlier pages of this article had been printed I had an opportunity to compare our species of Pleurotomidæ with those obtained by the Blake Expedition in the West Indian seas, and now in the hands of Mr. Dall, who has described most of them, and who kindly aided me in making the comparisons.

The species described above as *P. Diomedeæ* appears, on comparison of the type-specimens, to be identical with *P. bandella* Dall. The other species described by Mr. Dall all appear to be distinct from those described by me, but our *P. Emertoni* (p. 154) is identical with one of his undescribed species.

Mangilia cerina (Kurtz and Stimpson) Verrill.

These Transactions, vol. v, p. 488, fig. 1, 1881.

Plate XXIX, figures 16, 16*a*.

Animal translucent white, with flake-white specks on the foot and other parts. Foot short, truncate, or obtusely rounded in front, with the angles little or not at all prominent. Tentacles rather long, very slender, with conspicuous black eyes close to the ends, the tips extending slightly beyond the eyes, as small papillæ. Head small. No operculum.

Found living in Buzzard's Bay, at Quisset, Mass., in 3–5 fathoms, Sept. 4, 1882.

Taranis Morchii, var. **tornatus** Verrill, nov.

Two specimens from station 2077, in 1255 fathoms, are somewhat stouter than those previously obtained, and have the principal carina, forming the shoulder, larger and more prominent than usual, but it bears only very minute tubercles, corresponding to the very fine and close riblets which cross the wide and abruptly sloping subsutural band obliquely, and are about twice as numerous and much finer than in the ordinary variety. On the last whorl there are about six prominent, distant, revolving cinguli below the shoulder, besides some faint ones on the base of the canal; the space between the uppermost of these and the shoulder-carina is greater than usual. The lines of growth are much finer than in the ordinary form and do not take the appearance of riblets on the last whorl, nor do they render the cinguli nodulous. The suture is sharply impressed, and the raised revolving line usually present just below the suture is absent. This form, therefore, is characterized by the relative predominance of the spiral sculpture over the transverse, and by the absence of distinct nodules at the crossing of the two systems of lines.

Length, 5^{mm}; breadth, 3^{mm}; length of aperture, $2{\cdot}6^{mm}$; its breadth, 1^{mm}.

Sipho lividus (Mörch).

Verrill, these Transactions, vol. v, p. 507, 1881
Bush, Proc. U. S. Nat. Mus., vol. vi, p. 238, pl. 9, fig. 12, 1883.

Miss Bush has recorded this species from Labrador, at Henley Harbor and Dead Island, in 1 to 8 fathoms.

The figure referred to represents the same form as that which was described by me from the Gulf of St. Lawrence, and which has been referred by Whiteaves and others to *S. Spitzbergensis.*

Tritonofusus cretaceus (Reeve.)

Tritonofusus Kröyeri Verrill, these Transactions, vol. v, p. 510 (*non* Möller.)
Tritonofusus cretaceus Bush, Proc. U. S. Nat. Mus., vol. vi, p. 238, 1883.

Miss Bush has recorded this species from Labrador, in 3 to 10 fathoms.

A comparison of our American shell with specimens of the true *T. Kröyeri*, from the coast of Norway, sent to me by Dr. Friele, shows that they are two entirely distinct species.

Volutopsius Norvegicus (Chemn.) Mörch.

Verrill, these Transactions, vol. v, p. 511, 1881.

Shell ovate in outline, with a large expanded mouth. Spire short; whorls five, rapidly enlarging. Nuclear whorls smooth, rather large, mammilliform, making the spire obtuse at tip, the two first whorls increasing but little in breadth. The body-whorl is very large, with the shoulder well rounded, suture well-marked. Aperture large, almost semicircular, the outer lip regularly curved, the margin everted and sharp. Columella with a concave bend in the middle and a slightly prominent twisted lobe at the base of the siphon, which is short, broad, open, and but slightly curved. No obvious sculpture, except rather conspicuous lines of growth, parallel with the edge of the lip. A large, smooth, glazed area in front of the columella on the body-whorl. Color externally white, tinged with brown; nucleus yellowish; interior pink, the edge of the lip flesh-color.

Length, 72^{mm}; breadth, 44^{mm}; length of aperture, 54^{mm}; its breadth, 24^{mm}; diameter of the first nuclear whorl, 6^{mm}.

From the Flemish Cap, E. of Grand Bank, in 75 fathoms, Wm. Garrett, 1878.

Buccinum Tottenii Stimpson.

Verrill, these Transactions, vol. v, p. 496, 1881.
Bush, Proc. U. S. Nat. Mus., vol. vi, p. 239, pl. 9, fig. 13, 1883.

This species has been recorded by Miss Bush from Henley Harbor and Temple Bay, Labrador, in 8 to 15 fathoms.

The excellent figure referred to, illustrates the typical, well developed form of this species.

Anachis Haliæeti (Jeffreys).

Columbella haliæeti Jeffreys, Brit. Conch., iv, p. 356, 1867.
Anachis Haliæeti Verrill, Amer. Jour. Sci., vii, pp. 405, 503, 1874.
Pyrene costulata G. O. Sars, Moll. Reg. Arct. Norvegiæ, p. 252, pl. 23, fig. 16 (*non Fusus costulatus* Cantraine.)
Anachis costulata Verrill, these Transactions, vol. v, p. 513, pl. 43, fig. 7.
Columbella haliæeti Jeffreys, Proc. Zool. Soc. London, for 1883, p. 392 (synonymy.)

Although Mr. Jeffreys, in some of his recent papers, followed Monterosato and G. O. Sars in the identification of this species with the *Fusus costulatus* of Cantraine, in the paper last quoted he states that the true *F. costulatus* belongs to the genus *Pleurotoma*. He therefore restores the name, *Haliæeti*, for this species. I have no

reason to doubt the correctness of this decision, and therefore follow him in making this change.

Dolium Bairdii Verrill and Smith (MSS.)

Verrill, these Transactions, vol. v, p. 515.

PLATE XXIX, FIGURES 2, 2*a*, 2*b*.

This species was taken in 1882 at station 1092, in 202 fathoms, one young dead; station 1097, in 158 fathoms, two young dead, with large fragments; station 1109, in 89 fathoms, one young dead; station 1113, in 192 fathoms, one living; and fragments were also taken at stations 1117, 1120, 1121, and 1154, in 89 to 234 fathoms. An unusually large living specimen was taken by the Albatross at station 2004, N. lat. 37° 19′ 45″, W. long. 74° 26′, in 98 fathoms, March 23d, 1883 (No. 35,655).

Mr. Dall thinks this species is identical with one from the Mediterranean.

Assiminia modesta (Lea) Verrill.

Cingula modesta H. C. Lea, Proc. Boston Soc. Nat. Hist., i, p. 205, 1845; Boston Journ. Nat. Hist., v, p. 288, pl. 24, fig. 5, 1845.

Assiminia Grayana Verrill, Amer. Journ. Sci., xx, p. 250, September, 1880 (*non* Leach); Trans. Conn. Acad., v, p. 525, pl. 58, fig. 7, 1882.

Shell small, conical, with a regularly tapering, acute spire, with a smooth, somewhat glossy surface, usually light chestnut-brown in color. Whorls about six in the largest specimens, moderately convex, with the suture well impressed, but not deep, usually showing by translucency an internal sutural line just below the suture. There is no distinct sculpture unless microscopic and very indistinct lines of growth. Apical whorl very minute, regularly spirally coiled, slightly prominent, so as to produce a very acute apex. Last whorl very large, somewhat swollen, forming more than half the length of the shell. Base moderately produced, without any umbilicus, and destitute of sculpture. Aperture short-ovate, with an acute angle posteriorly, broadly rounded in front, with the inner margin oblique and only slightly sinuous; the outer lip is thin and sharp, convex and evenly rounded; the columella-margin is excurved, with the edge thickened and slightly everted, closely covering the umbilical region; it joins the anterior margin in a regular curve and continues along the margin of the body-whorl in a slightly sinuous line, forming there a distinct but closely adherent inner lip, consisting of a thin deposit continuous with the deposit of the umbilical region. Operculum subspiral, translucent, chestnut-brown. The shell is

usually light chestnut-brown, more or less lustrous, somewhat translucent, but it is sometimes tinged with greenish or grayish brown, in color conforming to the sea-weeds on which it lives.

Length of the largest specimens, about 3^{mm}; breadth, 2^{mm}; length of body-whorl, about 2^{mm}; of aperture, about 1^{mm}.

Newport, R. I., at high water mark, among decayed sea-weed, 1880; Huntington, L. I., between tides, (coll. Telkampff); near Brooklyn (Lea.)

This species, when found by me in 1880, was identified with *A. Grayana*, but the specimens obtained at that time were immature. An examination of larger and more mature specimens, from Huntington, L. I., and a direct comparison with a series of specimens of *A. Grayana*, sent to me by the Rev. A. M. Norman, has convinced me that, though closely related, they must be considered distinct species, unless *A. Grayana* be more variable than is indicated by European writers. Our species, when with the same number of whorls, is less than half the size of *A. Grayana*, and it has, proportionally, a much more slender form, with a more acute spire and more minute nucleus. The aperture is much smaller and narrower and the whole shell is much more delicate in form and texture. The color is a clearer chestnut-brown than any of the European specimens which I have seen, though this is, perhaps, a character of no great importance. In habits and in the situations in which it is found, it agrees precisely with the European species, with which it also agrees in the structure of the soft parts, as shown by the figure formerly published by me.

Eulima stenostoma Jeffreys.

Verrill, these Transactions, vol. v, p. 536.

This species, not previously known on our coast south of the Gulf of St. Lawrence, was taken in 1883 by the Albatross at stations 2043, 2076, 2084, 2096, 2103, in 906 to 1467 fathoms, and at station 2115 off Cape Hatteras, in 843 fathoms.

Margarita regalis Verrill.

These Transactions, vol. v, p. 530, pl. 57, fig. 37.

Specimens of this species were taken by the Albatross considerably exceeding in size those originally described by me. By Jeffreys (Proc. Zool. Soc. London for 1883, p. 98) this species has been identified as *Trochus Ottoi* Philippi,* which he also considers identical

* *Trochus Ottoi* Philippi, Moll. Sic., vol. ii, p. 227, pl. 28, fig. 9.

with *T. rhysus* and *T. ægleës* Watson and *T. Vaillanti* Fischer. The first named is fossil in the Pliocene of Calabria and Sicily. The recent form has been taken off the European coast, from off the Faroe Islands to the Bay of Biscay and Mediterranean, and by the Challenger in the West Indies, off St. Thomas.

The typical specimen of *T. ægleës* Watson, which I have examined, although having some resemblance to our shell, differs so much in many respects that, considered by themselves, they certainly appear to me very distinct species. I have not seen the fossil *T. Ottoi*, and am, therefore, unable to express any decided opinion as to the identity of the recent and fossil forms, especially as Mr. Jeffreys himself admits a considerable amount of variation in respect to the sculpture and umbilicus. These forms are doubtless closely allied, if not identical. *T. ægleës* appears to be nearer our *M. lamellosa*, with which Mr. Dall has even united it.

Cyclostrema Dalli Verrill, var. **ornatum**, nov.

Cyclostrema Dalli Verrill, these Transactions, vol. v, p. 513, pl. 57, fig. 39.

PLATE XXXII, FIGURE 17.

Among the specimens of this species there is one from station 2115, in 843 fathoms (No. 35,610) which, although agreeing in form and condition of the umbilical region with the original type, is very peculiarly marked on the base by thin, impressed lines, running obliquely and crossing the concentric spiral lines at a large angle, so as to produce a sort of "herring-bone" pattern as shown in our figure. This form, if persistent, should undoubtedly receive a varietal name. It may therefore be designated provisionally as var. *ornatum*.

This species would probably belong to the genus *Tharsis*, according to Jeffreys' classification, but as already stated, I doubt the validity of that generic division.

Fissurella Tanneri Verrill.

Proc. U. S. National Mus., vol. v, p. 333, 1882.

PLATE XXIX, FIGURES 13, 13*a*.

This species is closely allied to *Fissurella redimicula* Say,* originally described from the Miocene of Maryland. The latter, however, judging from three specimens which I have examined, is distinct, although it is probably the direct ancestral form from which the modern species has been derived. The fossil specimens are

* Journ. Acad. Nat. Sci. Phil., iv, p. 132, pl. 8, fig. 1, 1824.

relatively shorter and broader and more regularly elliptical than the recent ones, as well as higher and more conical; they also have the aperture more central. In sculpture the two forms are very similar, but the fossil specimens have the sculpture decidedly coarser, with the radiating lines stouter, more elevated, and more unequal, one stronger rib alternating usually with three to five smaller ones, while in *F. Tanneri* no such marked inequality exists. The apical pore and the internal callus are very similar in the two shells, but the pore is perhaps a little larger in the living form. A larger series of both the living and the fossil form might, however, show that they are both variable, and possibly grade into one another.

Addisonia paradoxa Dall.

Verrill, these Transactions, vol. v, p. 533.

PLATE XXIX, FIGURES 10, 11, 11*a*, 11*b*.

Mr. Dall has called my attention to the remarkable peculiarities in the structure of the animal of the male, which differs widely in appearance from the female (see our fig. 11*b*), owing to the fact that the large verge is closely united at base with the right tentacle.

Additional specimens were taken in 1882, living, at stations 1098, 1109, 1110, 1124, in 89 to 640 fathoms; and in 1883, at station 2011, in 81 fathoms, off Chesapeake Bay.

Choristes elegans, var. tenera Verrill.

These Transactions, vol. v, p. 541, pl. 58, figs. 27, 27*a*.

PLATE XXIX, FIGURES 9, 9*a*, 9*b*.

This species was taken in 1882 at station 1096, in 317 fathoms; station 1124, in 640 fathoms; and 1154, in 193 fathoms (one dead).

At station 1124 about twenty-five living specimens occurred in the empty egg-case of a skate (*Raia* sp.), in the same manner as those taken in 1881. They were associated with a limpet, *Propilidium pertenue ?* Jeffreys.

Young specimens of various sizes occurred in these instances with the adults. Three of these young specimens are figured on our plate 29. The youngest examples noticed consisted of about one and a half whorls; these are very small, white, regularly coiled, with the whorls well-rounded and increasing rapidly in size. The aperture is nearly round and somewhat oblique, with the lip perfectly continuous. The umbilicus is rather large and open and shows the previous whorls to the apex.

Cadulus Jeffreysii? Monterosato.

Verrill, these Transactions, vol. v, p. 559, 1882.

A number of good specimens, referred to this species with doubt, were taken off Cape Hatteras, at station 2115, in 843 fathoms. These are pretty regularly fusiform and taper gradually to both ends, the posterior end being decidedly smaller than the anterior. The inner or ventral side is usually nearly straight, but often somewhat concave, while the outer or dorsal side is pretty strongly and nearly regularly curved. The aperture is decidely obliquely truncated, but is nearly circular in a direct end-view. These specimens differ, therefore, from *C. Jeffreysii*, as figured and described by Jeffreys, in being less swollen medially, and more regularly tapered posteriorly, and especially in not being suddenly contracted and curved near the posterior end, as figured by him. It is possible, however, that these differences may be only unimportant variations, and I therefore refer this shell, for the present, to the European species.

Our specimens are mostly 5^{mm} in length, and about 1^{mm} broad, in the middle.

Cadulus propinquus? G. O. Sars.

Verrill, these Transactions, vol. v, p. 558, pl. 58, figs. 31, 32, 1882.

This species, like the last, is referred to the corresponding European form with much doubt. It differs especially in having the oral aperture decidedly obliquely truncated, while in the European *R. propinquus* it is described as not at all oblique, and this character is made an important one by Mr. Jeffreys. Our specimens are considerably smaller, more swollen dorsally, and relatively stouter than those we have referred to *Jeffreysii*.

The shell is short-fusiform, considerably swollen in the middle, and nearly evenly curved on the dorsal side, while the ventral side is usually nearly straight, but sometimes slightly concave, and usually slightly convex in the middle. The anterior end is gradually tapered from the middle to the aperture, which is rather large, decidedly oblique, nearly round in a front view, though often slightly compressed laterally. Behind the middle the shell tapers more rapidly to the posterior aperture, which is about two-thirds the diameter of the oral. Usually the posterior opening is simple, or nearly so, and transversely truncated, but in some specimens there is a shallow lateral notch on each side. The surface is polished and lustrous.

Length, 3^{mm}; greatest diameter, ·8^{mm}. Some specimens are more slender than the ones measured.

No additional specimens have been taken since those already recorded from the collections of 1880 and 1881.

Mytilimeria flexuosa Verrill and Smith, MSS.

Verrill, Amer. Journ. Sci., xxii, p. 306, 1881; xxiv, p. 365, 1882; these Transactions, vol. v, p. 567, pl. 58, fig. 38, 1882.

The animal of this shell, in alcohol, has a small and short anal tube, surrounded by small papillæ, and a very much larger incurrent orifice, occupying a ventral position and surrounded by numerous long and large tentacle-like papillæ; the orifice for the foot is small; the edge of the mantle is bordered by very small papillæ. There is a slender, translucent byssus. The hinge-ligament is strengthened by a distinct ossicle, placed lengthwise, more or less ovate in form, with the smaller end next to the hinge-teeth, and somewhat truncated.

Additional specimens were taken at station 1093, in 349 fathoms, 1882 (two living), and at station 2079, in 75 fathoms, 1883 (one large dead shell).

Pecchiolia gemma Verrill.

These Transactions, vol. v, p. 565, 1882.

PLATE XXX, FIGURES 7, 8.

Ossicle longitudinal, with the posterior end broadest and notched in the middle, the narrower anterior end truncated.

Three additional specimens of this species were taken at station 1093, in 349 fathoms, 1882; living specimens were also taken in 1883 at stations 2076 and 2078, in 906 and 499 fathoms; and dead valves at station 2077, in 1255 fathoms; station 2084, in 1290 fathoms; and station 2079, in 75 fathoms.

Venericardia granulata Say.

Say, Journ. Acad. Nat. Sci., vol. iv, p. 142, pl. 12, fig. 1, 1824.

Cardita granulata Conrad, Fossils of the Medial Tertiary of the U. S., p. 12, pl. 7, fig. 1, 1838.

Cardita borealis Conrad, Amer. Mar. Conch., p. 39, pl. 8, fig. 1, 1831.

Gould, Invert. Mass., Binney's edition, p. 146, fig. 455.

A direct comparison of fossil specimens from the Miocene of Virginia with a large series of recent specimens from various localities along our coast, both northern and southern, shows that the fossil

form cannot be regarded as specifically distinct from the recent shells. The latter show much greater differences among themselves than those that distinguish the fossil from the ordinary form, known as *V. borealis*, while all the variations are connected together by intermediate forms.

I also consider *V. Novangliæ* Morse, a mere variation of this common and variable species, hardly to be distinguished as a variety. It differs mainly in its thinner texture, lighter hinge-plate, and more transverse form—characters that are due partly to immaturity and partly to unfavorable conditions of growth.

Living shells, of the typical form of *V. borealis*, have been dredged by the U. S. Fish Commission, off the eastern coast of Virginia, where it is not uncommon, at moderate depths (57 to 150 fathoms).

Loripes lens Verrill.

These Transactions, vol. v, p. 569, 1882.

Jeffreys, in Proc. Zool. Soc. London, for 1882, p. 685, identifies our species with the *Loripes lacteus* of Europe. I am unable to accept this identification. Although allied forms, they seem to me as distinct as other species of this group.

Leda acuta (Conrad).

Nucula acuta Conrad, Amer. Mar. Conch., pl. 6, fig. 3.
Leda unca Verrill, Proc. U. S. Nat. Mus., iii, p. 401, 1880; these Transactions, v, p. 572, pl. 58, fig. 41, 1882 (*? non* Gould).
Leda acuta Tryon, Amer. Mar. Conch., p. 182, pl. 38, fig. 496 (poor).
? Leda commutata Philippi.

PLATE XXX, FIGURE 15.

Although this species was referred by me to *Leda unca* Gould, later investigations have rendered this identification doubtful. It is, however, as indicated in my former papers, probably identical with *L. acuta* Conrad, which was described much earlier. By Jeffreys it has been referred to *L. fragilis* (Chemn., sp.), which he considers identical with *L. commutata* Philippi. The identification of Chemnitz's figure is doubtful, and moreover he was not a binomial writer; it is therefore useless to attempt to restore his name. Not having seen authentic specimens of *L. commutata* (*L. fragilis* Jeffreys) from Europe, I am unable to express any decided opinion as to its identity with our shell. In any case, *acuta* seems to be the oldest available name for our shell.

In this shell the posterior dorsal area, when seen from the dorsal

side, is regularly elliptical and pretty clearly defined by the ridges running from the beak to the posterior tip; this area is covered by rather prominent, thin, or somewhat lamelliform, divergent ribs, which are regularly and rather closely arranged and somewhat narrower than their interspaces, distally; these ribs usually cover the whole surface, close up to the dorsal edge, which forms a somewhat prominent, sharp and nearly straight carina, but is not compressed and thin, as in some other related species. Within the dorsal area there is no circumscribed area, such as figured by D'Orbigny in *L. Jamaicensis*, with which Mr. Dall identifies our shell. Moreover, the anterior lunule, represented as very distinct in the latter, is obscure and often entirely wanting in our shell. When visible at all, the lunular area is narrow, elongated and defined only by the interruption of the concentric ribs, just before reaching the hinge-margin, leaving a nearly smooth dorsal area between the umbos. Moreover, on the anterior end of the shell there are two rather faint, slightly raised ridges, or waves, a short distance apart, extending from the beak to the anterior ventral margin, and having the area between them slightly concave, corresponding to a flattened or slightly concave space on the margin, where it terminates; this slight undulation, bordered by two small crests, is, however, usually less distinct than represented in our figure. The posterior end is decidedly acute with a distinct emargination below it, but the ridge, which runs from the beak to the posterior tip, though somewhat prominent, is obtusely rounded and decidedly less developed than in *L. Jamaicensis*. The concentric ribs are clearly defined, usually very regular, obtusely rounded, or frequently with the edge reflexed anteriorly, and often rising into little angles or points in crossing the posterior ridge; the interspaces are rather deep, nearly smooth, and usually about twice the breadth of the ribs on the sides of the shell. The epidermis is closely adherent and usually dark olive-green.

Well-grown specimens are frequently 13^{mm} long; 8^{mm} broad; and 6^{mm} thick; from the beak to the posterior tip, 8^{mm}.

A species closely related to this, but evidently distinct, which is most likely the true *L. unca* Gould, was dredged by the Albatross off Cape Hatteras in 14 to 48 fathoms, in considerable numbers.

This shell is more solid, more ovate, and more swollen medially, with the beak nearly central, the posterior end very acute, and the posterior dorsal margin slightly concave, while the concave dorsal area is defined by a rounded and not very prominent ridge. The umbos are nearly smooth, polished and lustrous in the adult dead

shells, but concentrically lined in the young. The surface is elsewhere covered with pretty regular and not very close, slightly elevated concentric lamellæ, which are sometimes more or less reflexed at the anterior end, while on the posterior dorsal area they are thin, more elevated, nearly straight and divergent. There is no distinctly defined lunular area, nor any definite radiating ridges running from the beak to the anterior margin, though a very indistinct undulation may sometimes be detected. The ventral margin is pretty regularly curved and shows no indentation below the acute posterior tip.

Amussium, sp.

Amussium fenestratum Verrill, these Transactions, vol. v, p. 582 (*non* Forbes).

Mr. W. H. Dall has called my attention to the fact that the American specimens formerly referred by me to the species quoted are specifically distinct from the European types. I have been able to confirm this opinion by direct comparison of our shell with typical specimens sent to me by the Marquis de Monterosato. Our shell has a peculiar transverse striation on the hinge-margin not seen in the European specimens, and not more than two internal ribs, one on each side. The sculpture, also, is finer.

Pecten pustulosus Verrill.

Pecten Hoskynsi and var. *pustulosus* Verrill, these Transactions, vol. v, p. 581, pl. 42, figs. 22, 22*a*; pl. 44, fig. 11 (*non P. Hoskynsi* Forbes).

By Mr. W. H. Dall, who has made a special study of the shells of this group, our American species is believed to be distinct from the typical Mediterranean form, with which he has been able to compare them directly. Although they are closely similar in form and external sculpture, our specimens differ in the hinge and in the absence of internal radiating ribs, characteristic of the genus *Amussium*, and which are present in the true *A. Hoskynsi*.

Possibly *P. imbrifer* Lovén may be identical with *P. pustulosus*, and not with *A. Hoskynsi*, to which it has been referred. In that case Lovén's name would have priority.

Pecten Clintonius Say.

Pecten Clintonius Say, Journ. Acad. Nat. Sci. Phil., iv, p. 124, 1824, pl. 9, fig. 2.
Pecten tenuicostatus Mighels, Proc. Bost. Soc. Nat. Hist., i, p. 49, 1841 (young).
Pecten principoides Emmonds, Report N. C. Geol. Survey, 1858, p. 280, fig. 198.

A comparison of specimens of this Miocene species, from Surrey, Va., with the more strongly ribbed, deep-water form hitherto

recorded by me as *Pecten tenuicostatus*, var. *aratus*, shows that they are in all respects essentially identical. In the fossil specimens the ribs are much stronger and more regular than in ordinary specimens of *P. tenuicostatus*, but not more so than in many deep-water specimens taken in 65 to 125 fathoms, off Martha's Vineyard; while among the numerous specimens dredged by us, all gradations between the strongly ribbed form and those forms, common in shallow water, in which the ribs are much more slender, indistinct, or almost obsolete. The forms of the main shell and of the auricles are the same, however, in all these varieties. The fossils, like all the recent specimens, show the peculiar, fine, oblique striæ or vermiculations between the ribs, both on the body of the shell and on the auricles. In the fossil specimens the ribs, especially those towards the ends of the shell and on the auricles, are crossed by the raised lines of growth in such a way as to form small, rather close, distinctly arched, raised scales; this character, which is not usually seen in the smoother, shallow-water form, is found in many of the deep-water specimens quite as prominently, or even more so, than in the fossil.

There being no doubt, therefore, of the identity of the fossil and recent shells, the name, *Clintonius*, should be adopted for the species, on account of its priority, while the name, *tenuicostatus*, may well be retained to designate the ordinary smoothish, mostly shallow-water variety, found on the New England coast. This name was originally given by Dr. Mighels to very young specimens of this smoothish variety, under the impression that they were a distinct species, but he afterwards recognized the fact that they were only the young of the common species, at that time generally known as *Pecten Magellanicus* Lam.

The following species should have been inserted on page 206.

Propilidium pertenue? Jeffreys.

Proc. Zool. Soc. London, for 1882, p. 674, pl. 50, fig. 7.

Four or five specimens of a small limpet occurred at station 1124, in 640 fathoms, in the egg-case of a species of *Raia*, associated with *Choristes elegans*. These agree in most respects with *P. pertenue* Jeff., but the beak is nearer to the posterior margin, and the shell is thin and opaque white, without much luster, even when living, but the surface is nearly smooth, though showing slight but distinct lines of growth and sometimes faint traces of microscopic radiating lines, in this respect and the position of the beak resembling more *P. compressum* Jeff.

The form is pretty regularly elliptical. The apex is situated near the posterior margin, prominent, acute, and directed strongly backward; it consists of rather more than one small coil, which is regularly incurved and not distinctly turned to one side. The internal septum is narrow and transverse.

Although not agreeing exactly with either of Jeffreys' species, I refer it doubtfully to *P. pertenue.*

List of Deep-water and Surface Mollusca taken off the East Coast of the United States by the U. S. Fish Commission steamers, Fish Hawk and Albatross, 1880 *to* 1883.

The following list includes all the species hitherto dredged along the Gulf Stream slope, from off Cape Hatteras to Nova Scotia, except a small number of minute species, not yet fully identified. In general, those species that have not occurred below 60 fathoms are omitted. But the surface species of Heteropoda, Pteropoda, etc., belonging to the Gulf Stream region, are included, whether taken living at the surface or dead from the bottom.

The "Bathymetrical range" refers only to the range as actually observed in this region by the Fish Commission, unless otherwise stated. The geographical distribution is indicated, in a general way, by the abbreviations following the range in depth, but it is not intended to be complete in this respect. Owing to the uncertainty in respect to the alleged identity of the species recorded from other regions with our own, and to the incompleteness of the published lists of species collected by various recent dredging expeditions, the knowledge of the foreign distribution of many of these species is still very imperfect and sure to be largely increased within a few years, so that any facts of this kind that can now be given will have, at best, only a temporary value. The abbreviations are as follows: N. = northern, indicates that the species ranges northward along the American coast, beyond New England waters; S., = southern, southward beyond Cape Hatteras; Arc., =Arctic; Eu., =European; Med., =Mediterranean; Af., =West African; P., =North Pacific; As., =North Asia; Cb., =Caribbean Sea and West Indies; Oc., = Oceanic or pelagic.

After the names, references are given to the pages and plates where the species are described or figured in this volume (vi) or the

preceding volume (v) of these Transactions. As it is always important, in giving the bathymetrical distribution of shells, to distinguish between those taken alive and those of which only dead shells are obtained (which may have been carried by fishes and various other agencies far from their true habitats), an asterisk (*) is added to designate living specimens; while a dagger (†) indicates dead shells. When no sign is added, it is to be understood that the specimens were living.

In the preparation of the following list I have been greatly aided by my assistant, Miss K. J. Bush, who has been engaged for several years in cataloguing and tabulating the shells collected by the Fish Commission.

CEPHALOPODA.

Lestoteuthis Fabricii (Licht.) V. v, 291, 390, pl. 45, f. 1–2*d*; pl. 46, f. 1–1*f*; pl. 55, f. 1–1*d*.
Bathymetrical range, 255 to 906 fathoms. N., Arc., P.

Abralia megalops V. vi, 143, pl. 28, f. 2.
B. range, 173 f. Cb.

Ommastrephes illecebrosus (Les.) V. v, 268, pls. 28, 29, 37, 38, 39.
B. range, 0 to 1022 f.; beaks 1091 to 1917 f. N.

Sthenoteuthis Bartramii V. v, 288.
Surface.* Southern. Oc.

Mastigoteuthis Agassizii V. v, 297, pl. 48; pl. 49, f. 2, 3–3*g*; vi, 243.
B. range, 640 to 1050 f.

Chiroteuthis lacertosa V. v, 299, 408, pl. 47, f. 1–1*b*, pl. 56, f. 1–1*f*; vi, 243.
B. range, 435 to 2221 f. (2949, arms). N.

Leptoteuthis diaphana V. vi, 141, pl. 32, f. 1.
B. range, 1731 f.

Brachioteuthis Beanii V. v, 406, pl. 55, f. 3–3*b*; pl. 56, f. 2–2*a*; vi, 245.
B. range, 183 to 843 f.

Calliteuthis reversa V. v, 295, pl. 46, f. 1–1*b*; vi, 243.
B. range, 365 to 2369 f.

Histioteuthis Collinsii V. v. 234, 300, 404, pl. 22; pl. 27, f. 3–5; pl. 37, f. 5.
B. range, 372 f. (beaks). Northern.

Desmoteuthis hyperborea (Steenst.) V. v, 302, pl. 27, f. 1–2; pl. 39, f. 1.
B. range, 641 f., off Chesapeake Bay. N., Arc.

Desmoteuthis tenera V. v, 412, pl. 55, f. 2–2*d*; pl. 56, f. 3; vi, 245.
B. range, 369 to 1346 f.

Stoloteuthis leucoptera V. v, 347, 418, pl. 31, f. 4–5; pl. 54, f. 4.
B. range, 182 to 640 f. N. of Cape Cod.

Rossia megaptera V. v, 349, pl. 38, f. 1; pl. 46, f. 6; vi, 245.
B. range, 640 f. Northern.

Rossia Hyatti V. v, 351, pl. 27, f. 8, 9; pl. 30, f. 1; pl. 31, f. 1, 2; pl. 46, f. 5.
B. range, 44 to 317 f. N. of Cape Cod. Northern.

Rossia sublevis V. v, 354, 419, pl. 30, f. 2; pl. 31, f. 3; pl. 46, f. 4; pl. 47, f. 2–4.
B. range, 115 to 640 f. N.
Heteroteuthis tenera V. v, 357, 419, pl. 46, f. 2–2*d*, 3–3*b*; pl. 47, f. 5–5*b*.
B. range, 18 to 301 f., eggs 317 f.
Argonauta argo Linné. v, 364, 420; vi, 247, pl. 28, f. 1–1*b*.
B. range, shells, 64 to 1917 f.; living at surface. Oc., Cb., S., Med.
Alloposus mollis V. v, 366, 420, pl. 50, f. 1–2*a*; pl. 51, f. 4; vi, 247.
B. range, 238 to 1346 f.; frag. 1735 f.
Octopus Bairdii V. v, 368, 421, pl. 33, f. 1, 1*a*; pl. 34, f. 5, 6; pl. 36, f. 10; pl. 38, f. 8; pl. 49, f. 4, 4*a*; pl. 51, f. 1, 1*a*.
B. range, 85 to 843 f.; 28 to 300 f. N. of Cape Cod. N., Eur.
Octopus piscatorum V. v, 377, pl. 36, f. 1, 2; vi, 248.
B. range, 1362 f. Northern.
Octopus lentus V. v, 375, pl. 35, f. 1, 2; pl. 51, f. 2.
B. range, 120 to 603 f. (Blake Exp.) Northern.
Octopus Carolinensis V. vi, 235.
B. range, 142 f., off Cape Hatteras.
Octopus gracilis V. vi, 236.
B. range, 1290 f.
Eledone verrucosa V. v, 380, pls. 52, 53; vi, 248.
B. range, 787 to 1255 f.
Eledonella pygmœa V. vi, 145, pl. 32, f. 2.
B. range, 2949 f., off Chesapeake Bay.
Stauroteuthis syrtensis V. v, 382, pl. 32, f. 1–5; vi, 249.
B. range, 499 f., off Nova Scotia. N.

GASTROPODA.

Toxoglossa.

Admete Couthouyi Jay (=*A. viridula* Gld.)
B. range, 155 to 1255 f. N., Arc., Eu.
Pleurotoma Dalli V. and S. v, 451, pl. 57, f. 1–1*a*.
B. range, 94 to 142 f.*; 146 f.†
Pleurotoma Carpenteri V. and S. v, 452, pl. 57, f. 2.
B. range, 86 f.†; 100 to 155 f.*
Pleurotoma comatotropis Dall. v, 452.
B. range, 100 f.† Cb.
Daphnella limacina (Dall.) v, 452.
B. range, 368 f. Cb.
Pleurotomella Packardii V. v, 453, pl. 43, f. 9; pl. 57, f. 5.
B. range, 193 f.†; 85 to 110 f. N. of Cape Cod.
Pleurotomella Agassizii V. and S. v, 454, pl. 57, f. 3, 3*a*.
B. range, 39 to 1309 f.*; 1608 f.†
Pleurotomella Bairdii V. and S. vi, 147, pl. 31, f. 1.
B. range, 1608 to 1731 f.*; 2221 f.†
Pleurotomella Pandionis V. v, 456, pl. 57, f. 4, 4*a*.
B. range, 238 to 310 f.†; 319 f.*

Pleurotomella Benedicti V. and S. vi, 148, pl. 31, f. 2, 2*a*.
B. range, 1290 f.
Pleurotomella Sandersoni V. vi, 149, pl. 31, f. 3, 3*a*.
B. range, 1290 to 2033 f.
Pleurotomella Saffordi V. and S. vi, 151, pl. 31, f. 4, 4*a*.
B. range, 843 to 1608 f.
Pleurotomella bandella Dall=*P. Diomedeæ* V. vi, 152, 250, pl. 31, f. 5-5*a*.
B. range, 1290 to 2033 f. Cb.
Pleurotomella Emertoni V. and S. vi, 154, pl. 31, f. 6.
B. range, 1917 f.† Off Chesapeake Bay. Cb.
Pleurotomella Bruneri V. and S. vi, 155, pl. 31, f. 7, 7*a*.
B. range, 1608 f.*; 2033 f.†
Pleurotomella Catharinæ V. and S. vi, 155, pl. 31, f. 9, 9*a*.
B. range, 843 to 2033 f.
Gymnobela engonia V. vi, 157.
B. range, 906 to 1451 f.†; 1608 f.*
Gymnobela curta V. vi, 158, pl. 31, f. 10.
B. range, 843 to 1290 f.*; 1467 to 1917 f.†
Gymnobela curta, var. *subangulata* V. vi, 159.
B. range, 197 to 2033 f.†; 1290 to 1451 f.*
Bela (?) *tenuilirata* Dall. v, 463.
B. range, 365 f.† P.
Bela hebes V. v, 459, pl. 57, f. 7.
B. range, 252 to 906 f.*; 1290 to 2033 f.†
Bela pygmœa V. v, 460, pl. 57, f. 8.
B. range, 312 to 1290 f. N.
Bela incisula V. v, 461, pl. 43, f. 12; pl. 57, f. 14.
B. range, 18 to 480 f.† N.
Bela Gouldii V. v, 465, pl. 57, f. 6, 6*a*.
B. range, 300 f.† (6½ to 122 f., N. of Cape Cod). N.
Bela mitrula, var. *concinnula* V. v, 468, pl. 43, f. 15; pl. 57, f. 11; vi, 249.
B. range, 100 f.†; 252½ to 487 f.* N., Eu.
Bela harpularia (Couth.) H. and A. Ad. v, 473, pl. 43, f. 14; pl. 57, f. 9.
B. range, 10 to 28½ f.*; 368 f.† N.
Bela cancellata (Mighels) Stimpson. v, 475, pl. 43, f. 10, 11; pl. 57, f. 13.
B. range, 126 to 547 f.† N., Arc., Eu.
Bela pleurotomaria (Couthouy) Adams. v, 478.
B. range, 16 to 208 f.† N., Arc., Eu.
Bela Rathbuni V. vi, 236.
B. range, 1395 f.† Off Cape Hatteras.
Bela subvitrea V. vi, 160.
B. range, 843 f. Off Cape Hatteras.
Bela subturgida V. vi, 161.
B. range, 843 f. Off Cape Hatteras.
Spirotropis ephamilla V. vi, 162.
B. range, 1917 f.†; 2221 f.* Off Chesapeake Bay.
Typhlomangilia Tanneri V. and S. vi, 163, pl. 31, f. 8.
B. range, 1290 f.

Taranis Mörchii (Malm) Jeffreys. v, 486, pl. 57, f. 18.
B. range, 365 f.†; 368 to 858 f.* N., Arc., Eu. Cb.
Taranis Mörchii, var. *tornatus* V. vi, 251.
B. range, 1255 f. Off Nova Scotia.
Taranis pulchella V. v, 487, pl. 57, f. 17; vi, pl. 29, f. 8.
B. range, 349 to 487 f.

RACHIGLOSSA.

Marginella borealis V. vi, 165, pl. 29, f. 4.
B. range, 64 to 100 f.†; 66½ to 81 f.*
Volutella lachrimula Gld. vi, 166.
B. range, 142 f.*; 516 f.† Off Cape Hatteras. S.
Buccinum Sandersoni V. v, 490, pl. 58, f. 9.
B. range, 156 f.†; 208 to 264 f.*
Buccinum undatum Linné. v, pl. 58, f. 10.
B. range, 6 to 123 f.*; 142½ to 843 f.† N., Arc., Eu.
Buccinum cyaneum Brug. v, 492, pl. 43, f. 5; pl. 58, f. 11.
B. range, 101 to 150 f., off Cape Cod. N., Arc., Eu.
Buccinum abyssorum V. and S. vi, 167, pl. 31, f. 11–11*b*.
B. range, 49 f.†; 906 to 1309 f.*
Sipho Stimpsonii Mörch. v, 499, pl. 57, f. 24.
B. range, 16 to 300 f. N.
Sipho Stimpsonii, var. *liratulus* V. v, 500.
B. range, 18 f.†; 55 to 319 f.* N.
Sipho pubescens V. v, 501, pl. 43, f. 6; pl. 57, f. 25.
B. range, 18 to 179 f.†; 192 to 640 f.* N.
Sipho pygmæus (Gld.) V. v, 501, pl. 57, f. 21.
B. range, 12 to 640 f. N.
Sipho pygmæus, var. *planulus* V. v, 505 (note).
B. range, 20 to 350 f. N.
Sipho parvus V. and S. v, 504, pl. 57, f. 20–20*b*.
B. range, 193 to 906 f.
Sipho obesus V. vi, 168.
B. range, 843 f. Off Cape Hatteras.
Sipho profundicola V. and S. vi, 170, pl. 31, f. 13.
B. range, 1497 to 1917 f.†; 2033 f.*
Sipho profundicola, var. *dispar* V. vi, 171.
B. range, 1555 f.
Sipho glyptus V. v, 505, pl. 57, f. 22; pl. 58, f. 1, 1*a*.
B. range, 193 to 547 f.
Sipho cælatus V. v, 506, pl. 57, f. 19, 19*a*.
B. range, 75 to 616 f.†; 302 to 516 f.*
Sipho cælatus, var. *hebes* V. vi, 172.
B. range, 640 to 1255 f.
Sipho (Mohnia) *cælatulus* V. vi, 172.
B. range, 516 to 547 f.†; 906 to 1290 f.*

Sipho (Mohnia) *simplex* V. vi, 174.
B. range, 99½ f.†; 843 f.*
Sipho (?) *leptaleus* V. vi, 175, pl. 31, f. 16.
B. range, 452 f.†
Sipho (?) *hispidulus* V. vi, 239.
B. range, 2033 f.* Off Delaware Bay.
Neptunea despecta (Linné) Ad., var. *tornata* (Gld.)
B. range, 69 to 100 f.† off George's Bank. N., Arc., Eu.
Neptunea decemcostata (Say) H. and A. Ad.
B. range, 6 to 322 f.†; 41 to 86 f.* N.
Nassa nigrolabra V. v, 512, pl. 58, f. 12.
B. range, 155 f.*; 349 f.†
Trophon Lintoni V. and S. vi, 176, pl. 29, f. 1.
B. range, 70 f.†
Trophon clavatus Sars. vi, 176.
B. range, 843 to 2033 f. Eu.
Urosalpinx Carolinensis V. vi, 237.
B. range, 142 to 516 f.†; 938 f.* Off Cape Hatteras.
Urosalpinx macra V. vi, 239.
B. range, 142 f.†
Anachis Haliæeti (Jeff.). v, 513, pl. 43, f. 7; vi, 252.
B. range, 79 f.†; 115 to 640 f.* N., Arc., Eu.
Astyris diaphana V. v, 513, pl. 58, f. 2.
B. range, 64 f.†; 100 to 487 f.*
Astyris zonalis (Lins.) V. v, 515.
B. range, 9 to 202 f. N.
Astyris pura V. v, 515.
B. range. 71 f.†; 100 to 1255 f.*

TÆNIOGLOSSA.

Dolium Bairdii V. and S. v, 515; vi, 253, pl. 29, f. 2–2*b*.
B. range, 89 to 234 f.†; 98 to 202 f.*
Benthodolium abyssorum V. and S. vi, 177, pl. 31, f. 12–12*b*.
B. range, 1395 f.†; 2221 f.* Off Chesapeake Bay.
Natica clausa Brod. and Sowerby.
B. range, 13 to 1255 f.†; 238 to 843 f.* N., Arc., Eu.
Lunatia nana (Möll.) Sars. v, 516, pl. 42, f. 9.
B. range, 27 to 28 f.*; 430 f.† N., Arc., Eu.
Lunatia heros (Say) H. and A. Adams.
B. range, 0 to 238 f. N., S.
Lunatia Grönlandica (Möll.) Ad.
B. range, 12½ to 65 f.†; 75 to 1290 f.* N., Arc., Eu.
Lamellaria pellucida V. v, 518, pl. 58, f. 4, 5, 5*a*.
B. range, 86 to 787 f.
Lamellaria pellucida, var. *Gouldii* V. v, 518, pl. 58, f. 3.
B. range, 44 to 1497 f.
Piliscus commodus (Midd.). vi, 191.
B. range, 150 f., off Nova Scotia. Arc., Eu.

Capulus Hungaricus (Linné). v, 519; vi, pl. 29, f. 6.
B. range, 71* to 458 f. Eu.
Crucibulum striatum (Say) H. and A. Adams.
B. range, 3 to 65 f.*; 100 f.† N.
Crepidula plana Say.
B. range, 0 to 55 f.*; 155 to 487 f.† N., S.
Velutina lævigata (L.) Gld.
B. range, 15½ to 86 f.*; 100 to 130 f.† N., Arc., Eu.
Torellia fimbriata V. and S. v, 520, pl. 57, f. 27, 27*a*.
B. range, 142½ to 321 f.
Torellia fimbriata, var. *tiarella* V. v, 521.
B. range, 182 f.
Torellia vestita Jeff. v, 521, pl. 42, f. 5.
B. range, 4½ to 86 f.†; 146 to 317 f.* N., Eu.
Trichotropis (*?*) *inflata* Friele. vi, 178.
B. range, 1290 f. Arc.
Litiopa bombyx Rang. v, 523.
Surface.* S., O.
Cingula Jan-Mayeni (Friele) V. v, 524, pl. 42, f. 8.
B. range, 238 to 1290 f. N., Arc.
Cingula brychia V. vi, 179, pl. 32, f. 9.
B. range, 349 to 1290 f.
Cingula carinata Migh.
B. range, 4 to 25 f.*; 18 to 355 f.† N., Arc.
Cingula syngenes V. vi, 180, pl. 32, f. 11.
B. range, 142 f.† Off Cape Hatteras.
Cingula leptalea V. vi, 182, pl. 32, f. 10.
B. range, 858 f. Off Nova Scotia.
Cingula apicina V. vi, 183, pl. 32, f. 8.
B. range, 1608 f.
Cingula Sandersoni V. vi, 241.
B. range, 142 f.† Off Cape Hatteras.
Cingula aculeus Gld.
B. range, 0 to 349 f. N., Arc., Eu.
Cingula turgida ? (Jeff.) V. v, 524.
B. range, 487 f.† Eu.
Cingula harpa V. v. 523, pl. 58, f. 6.
B. range, 319 to 487 f.†
Cingula areolata (Stimp.) V. v, 524, pl. 43, f. 2.
B. range, 134 to 349 f. N.
Cithna tenella, var. *costulata* Jeff. vi, 184.
B. range, 2033 f. Off Delaware Bay. Eu., Med., Azores.
Cithna cingulata V. vi, 184, pl. 32, f. 7.
B. range, 906 to 1290 f.†; 1467 f.*
Cithna (*?*) *olivacea* V. vi, 185, pl. 29, f. 5.
B. range, 193 to 1290 f.†
Fossarus elegans V. and S. v, 522, pl. 57, f. 28.
B. range, 100 to 142 f.†

Seguenzia formosa Jeff. vi, 186, pl. 31, f. 14-14*b*.
B. range, 1290 to 2033 f. Eu.
Seguenzia formosa, var. *nitida* V. vi, 188.
B. range, 2033 f. Off Delaware Bay.
Seguenzia eritima V. vi, 189, pl. 31, f. 15.
B. range, 1290 to 2033 f.
Cerithiella Whiteavesii V. v, 522, pl. 42, f. 7.
B. range, 238 to 843 f. N.
Aporrhais occidentalis Beck.
B. range, 34½ to 1000 f.†; 115 to 349 f.* N.

PTENOGLOSSA.

Scalaria Dalliana V. and S. v, 527, pl. 57, f. 33.
B. range, 85 f.†; 115 to 193 f.*
Scalaria Pourtalesii V. and S. v, 527, pl. 57, f. 32.
B. range, 85 to 146 f.
Scalaria Leeana V. v, 526, pl. 57, f. 34.
B. range, 146 f.†
Scalaria Andrewsii V. v, 526, pl. 57, f. 35.
B. range, 100 f.†; 547 f.*
Acirsa gracilis V. v, 528, pl. 57, f. 31.
B. range, 349 to 843 f.†; 487 to 547 f.*
Aclis striata V. v, 528, pl. 58, f. 13.
B. range, 100 f.
Aclis Walleri J. v, 528, pl. 57, f. 36.
B. range, 349 f.†; 365 to 938 f.* Eu.
Aclis tenuis V. v, 528, pl. 58, f. 19.
B. range, 100 f.
Solarium boreale V. and S. v, 529, pl. 57, f. 29, 30.
B. range, 115 f.*; 146 to 193 f.†
Ianthina fragilis Desh.
Surface.† S., O.

RHIPHIDOGLOSSA.

Rotella cryptospira V. vi, 241.
B. range, 142 f.† Off Cape Hatteras.
Ethalia multistriata V. vi, 242.
B. range, 142 f.† Off Cape Hatteras.
Leptothyra induta Watson. vi, 197.
B. range, 142 f.† Off Cape Hatteras.
Calliostoma occidentale (Migh.).
B. range, 207 f.†; 365 to 640 f.* N., Arc., Eu.
Calliostoma Bairdii V. and S. v, 530, pl. 57, f. 26.
B. range, 56 to 640 f.†; 64 to 192 f.* Cb.
Margarita regalis V. and S. v, 530, pl. 57, f. 37; vi, 254, pl. 29, f. 14.
B. range, 64 to 173 f.†; 193 to 1555 f.*
Margarita lamellosa V. and S. v, 530, pl. 57, f. 38.
B. range, 100 to 192 f.†

Machæroplax obscura (Couth.) Friele.
B. range, 12½ to 487 f. N., Arc., Eu.
Machæroplax obscura, var. *carinata* V. v, 532.
B. range, 100 to 208 f.†; 266 to 335 f.* N.
Cyclostrema Dalli V. v, 532, pl. 57, f. 39; vi, pl. 29, f. 15.
B. range, 487 to 858 f.
Cyclostrema Dalli, var. *ornatum* V. vi, 255, pl. 32, f. 17.
B. range, 843 f.
Cyclostrema cingulatum V. vi, 198, pl. 32, f. 14.
B. range, 547 f.†
Cyclostrema affine V. vi, 199, pl. 32, f. 15.
B. range, 365 to 858 f.†; 843 f.*
Cyclostrema diaphanum V. vi, 199, pl. 32, f. 16.
B. range, 1290 f.*; 2033 f.†
Tharsis, sp. vi, 201.
B. range, 843 f.† Off Cape Hatteras.
Ganeza, sp. vi, 201.
B. range, ?† (Blake Exp.)
Scissurella crispata Flem. v, 533.
B. range, 238 or 365 f.† N., Eu., Med.
Fissurella Tanneri V. vi, 255, pl. 29, f. 13, 13*a*.
B. range, 104 f.*; 142 f.† Southern.
Puncturella noachina (L.) Lowe.
B. range, 16 f.†; 34 to 640 f.* N., Arc., Eu.
Puncturella (Fissurisepta) *eritmeta* V. vi, 204, pl. 32, f. 19, 19*a*.
B. range, 1451 f.
Propilidium elegans V. vi, 205.
B. range, 1395 f. Off Chesapeake Bay.
Propilidium pertenue Jeff. (?), vi, p. 262.
B. range, 640 f. Eu.
Addisonia paradoxa Dall. v, 533; vi, 256, pl. 29, f. 10, 11–11*b*.
B. range, 66½ to 202 f.†; 71 to 156 f.* (? Eu., Med.).‡
Cocculina Rathbuni Dall. v, 534.
B. range, 100 to 616 f.
Cocculina Dalli V. vi, 203.
B. range, 317 f.†
Cocculina Beanii Dall. v, 533; vi, pl. 29, f. 12.
B. range, 365 f.† Cb.
Cocculina leptalea V. vi, 202, pl. 32, f. 20–20*b*.
B. range, 1395 to 2033 f. Southern.
Cocculina spinigera Jeff. vi, 203.
B. range, 335 to 843 f. Eu.
Cocculina conica V. vi, 204.
B. range, 499 f. Off Nova Scotia.
Lepetella tubicola V. and S. v, 534, pl. 58, f. 29–29*a*.
B. range, 142 to 547 f.†; 134 to 396 f.* Eu.

‡ By Mr. Jeffreys this species is identified with *A. eccentros* Jeff. = *Gadina excentrica* Tib., of the Mediterranean. (Proc. Z. Soc. London, 1882, p. 673.)

POLYPLACOPHORA.

Hanleyia mendicaria (Migh.) Carp. v, 534.
B. range, 49 to 317 f. N., Arc., Eu., Med.
Trachydermon albus (Linné.) Carp.
B. range, 99½ f., off Nova Scotia. Arc., Eu.
Trachydermon exaratus (Sars). vi, 208, pl. 30, f. 2–2*b*.
B. range, 101 to 194 f. Eu.
Leptochiton alveolus (Sars) Lovén. v, 534.
B. range, 99½ to 640 f. N., Eu.
Placophora (Euplacophora) *Atlantica* V. and S. vi, 206, pl. 30, f. 1, 1*b*.
B. range, 122 to 640 f.

GYMNOGLOSSA.

Stilifer Stimpsoni V. v, 535, f. 2.
B. range, 6 to 1255 f. N.
Stilifer curtus V. v, 535.
B. range, 410 to 1255 f.
Eulima intermedia Cantr. v, 535, pl. 58, f. 20.
B. range, 85 to 155 f. Eu.
Eulima distorta Desh. v, 536.
B. range, 115 f. Eu.
Eulima stenostoma Jeff. v, 536; vi, 254.
B. range, 843 to 1451 f.*; 1467 f.† N., Eu.
Turbonilla Emertoni V. v, 536, pl. 58, f. 14, 14*a*.
B. range, 238 f.
Turbonilla nivea (St.) Ad.
B. range, 100 to 157 f.† N.
Turbonilla Rathbuni V. and S. v, 536, pl. 58, f. 15.
B. range, 64 to 1395 f.†; 100 to 365 f.*
Turbonilla Bushiana V. v, 537, pl. 58, f. 16.
B. range, 365 to 1290 f.*; 1451 to 1467 f.†
Eulimella Smithii V. v, 538, pl. 58, f. 18.
B. range, 85 to 120 f.*; 146 f.†
Eulimella lucida V. vi, 192, pl. 32, f. 3, 3*a*.
B. range, 2033 f.
Eulimella chariessa V. vi, 193, pl. 32, f. 4–4*b*.
B. range, 2033 f.
Eulimella nitida V. vi, 194, pl. 32, f. 5.
B. range, 2033 f.†
Eulimella (or *Menestho*) *lissa* V. vi, 195, pl. 32, f. 6.
B. range, 142 f. Off Cape Hatteras.
Menestho sulcata V. v, 539, pl. 58, f. 17.
B. range, 115 to 365 f.†
Menestho Bruneri V. v, 539.
B. range, 487 f.
Odostomia unidentata (Mont.)
B. range, 100 to 115 f.† Eu.

Odostomia tornata V. vi, 196.
B. range, 142 f.† Off Cape Hatteras.
Odostomia disparilis V. vi, 196.
B. range, 142 f.† Off Cape Hatteras.
Odostomia, sp. v, 539.
B. range, 365 f.†

TECTIBRANCHIATA.

Actæon nitidus V. v, 540, pl. 58, f. 21.
B. range, 238 to 843 f.*; 1451 f.†
Actæon melampoides Dall. vi, 210.
B. range, 843 f.† Off Cape Hatteras. Cb.
Ringicula nitida V. v, 540.
B. range, 100 to 547 f.†; 120 to 487 f.* Cb.
Choristes elegans, var. *tenera* V. v, 541, pl. 58, f. 27, 27*a*; vi, 256, pl. 29, f. 9-9*b* (young).
B. range, 193 f.†; 255 to 640 f.* Fossil in Canada.
Scaphander nobilis V. vi, 209, pl. 32, f. 18–18*d*.
B. range, 906 f.†; 1091 to 1309 f.*
Scaphander puncto-striatus (Migh.) Ad.
B. range, 46 to 1255 f.*; 1362 to 1467 f.† N., Arc., Eu.
Philine quadrata (Wood) Forb. and Han.
B. range, 20 to 266 f.†; 312 to 480 f.* N., Arc., Eu.
Philine Finmarchica Sars. v, 544.
B. range, 86 f. N., Eu.
Philine cingulata Sars. v, 544.
B. range, 155 to 487 f. Eu.
Philine, sp.
B. range, 100 f.
Philine amabilis V. and S. v, 544, pl. 58, f. 23, 24.
B. range, 120 to 156 f.
Philine tincta V. v, 544.
B. range, 67 f.
Amphisphyra globosa Lovén. v, 543.
B. range, 115 to 155 f.†; 319 to 843 f.* N., Eu.
Amphisphyra pellucida (Brown) Lovén.
B. range, 120 f.†; 20 to 365 f.* N., Arc., Eu.
Diaphana gemma V. v, 543, pl. 58, f. 22.
B. range, 100 to 2033 f.
Diaphana conulus (Desh.) V. v, 543, pl. 58, f. 25.
B. range, 100 f.†; 155 f.* Eu., Med.
Diaphana nitidula (Lov.) v, 543.
B. range, 155 to 906 f. Eu.
Diaphana pertenuis (Mighels).
B. range, 20 f.†; 319 to 386 f.* N., Arc., Eu.
Cylichna alba (Brown) Lovén.
B. range, 12 to 1091 f.*; 1290 f.† N., Arc., Eu.

Cylichna (?) *Dalli* V. v, 542; vi, pl. 29, f. 15.
B. range, 452 to 906 f.†; 938 to 1290 f.*
Cylichna occulta (Migh.) Ad.
B. range, 100 to 1467 f.*; 1608 f.† N., Arc., Eu.
Pleurobranchæa tarda V. v, 546, pl. 58, f. 26.
B. range, 28 to 640 f.
Koonsia obesa V. v, 545; vi, pl. 28, f. 7.
B. range, 192 to 312 f.

NUDIBRANCHIATA.

Heterodoris robusta V. and Em. v, 549, pl. 58, f. 35, 35*a*, 35*b*; vi, pl. 28, f. 5, 5*a*.
B. range, 458 f.
Issa ramosa V. and Em. v, 547, pl. 58, f. 36, 36*a*.
B. range, 100 to 321 f.
Doris complanata V. v, 549, pl. 58, f. 34-34*b*; vi, pl. 28, f. 6.
B. range, 86 to 194 f.
Scyllæa Edwardsii V. v, 550, pl. 43, f. 10.
Surface. Wood's Hole; off Cape Hatteras. Oc.
Dendronotus robustus V. v, 550.
B. range, 28 to 317 f. N., Eu.
Dendronotus arborescens Ald. and Han.
B. range, 13 to 351 f. N., Arc., Eu.
Dendronotus, sp.
B. range, 146 f.
Doto coronata (Gm.) Ald. and Han.
B. range, 0 to 10 f. Surface. N., Eu.
Fiona nobilis Ald. and Han. v, 551.
Surface. Oc., Eu.
Eolis papillosa (Linné) Forb. and Han.
B. range, 0 to 208 f. N., Arc., Eu.
Coryphella, sp.
B. range, 30 to 168 f.
Tergipes despectus (Johnst.) Ald. and Han.
B. range, 0 to 10 f. Surface. N., Eu.
Facelina pilata (Gld.) V.
B. range, l. w. to 146 f. Surface.

HETEROPODA.

Carinaria Atlantica Ad. and R. v, 529.
B. range, 65 f.† Oc.
Atlanta Peronii Les. v, 529; vi, pl. 28, f. 4, 4*a*.
B. range, 15½ to 1608 f.† Oc.
Atlanta Gaudichaudii Eyd. and Soul. vi, 211.
Surface.* Oc.
Atlanta rosea Soul. vi, 211.
B. range, 843 to 2369 f.†; surface.* Oc.

Atlanta Lamanonii Eyd. and Soul. vi, 211.
B. range, 1731 f.† Oc.
Atlanta pulchella V. sp. nov. vi, 211.
Surface.* Oc.
Atlanta inclinata Soul. vi, 211.
B. range, 516 to 843 f.†; surface.* Oc.
Firola Keraudrenii E. and S. vi, 212.
Surface.* Oc.

PTEROPODA.

Cymbulia calceolus V. v, 553, pl. 58, f. 33.
B. range, 18 to 1467 f.†; surface.* Oc.
Cavolina tridentata Gray. v, 554, f. 6, 7.
B. range, 45 to 2033 f.†; surface.* Oc.
Cavolina uncinata (D'Orb.) Gray. v, 554.
B. range, 64 to 1608 f.†; surface.* Oc.
Cavolina longirostris Les. v, 555.
B. range, 64 to 2033 f.†; surface.* Oc.
Cavolina gibbosa (Rang). vi, 213.
B. range, 193 to 1451 f.† Oc.
Cavolina quadridentata (Leseur). vi, 212.
B. range, 142 to 1467 f.† Oc.
Cavolina angulata (Soul.) vi, 213.
Surface.* Oc.
Cavolina inflexa (Les.) Gray. v, 555.
B. range, 487 to 1467 f.† Oc.
Pleuropus Hargeri V. v, 555; vi, pl. 28, f. 3.
Surface.* Oc.
Diacria trispinosa Gray.
B. range, 64 to 1451 f.†; surface.* Oc.
Clio pyramidata Linné. v, 555.
B. range, 64 to 2033 f.† Oc.
Balantium recurvum Children. v. 556.
B. range, 64 to 1917 f.† Oc.
Triptera columnella (Rang). v, 557; vi, 214.
B. range, 142 to 1608 f.† Oc., S.
Styliola virgula (Rang). vi, 213.
Surface.* Oc., S.
Styliola virgula, var. *corniformis* (D'Orb.). vi, 214.
Surface.* Oc., S.
Styliola subulata (Quoy and Gaimard). vi, 213.
B. range, 15½ to 1467 f.†; surface.* Oc., S.
Styliola recta Blainv. v, 556.
Surface.* Oc., S.
Spirialis retroversus (Flem.), var. *MacAndrei* Forbes. v, 557.
Surface. Oc., Eu., Med.

Spirialis Gouldii St. (*? S. balea* Möll., var.).
Surface. Oc., N., Eu.
Spirialis bulimoides Soul. vi, 215.
Surface.* Oc., S.
Spirialis trochiformis Soul. vi, 214.
Surface.* Oc., S.
Clione papilionacea Pallas.
Surface.* Oc., N., Arc., Eu.
Clione longicaudata Soul. vi, 215.
Surface.* Oc.
Trichocyclus Dumereillii (Oken.) Esch. vi, 215.
Surface.* Oc.

SOLENOCONCHA.

Dentalium solidum V. vi, 215.
B. range, 843 to 1309 f.
Dentalium striolatum Stimp.
B. range, 25 to 115 f.†; 146 to 1255 f.* N., Eu.
Dentalium occidentale Stimp. v, pl. 42, f. 16–18.
B. range, 26 to 115 f.†; 146 to 1255 f.* N., Eu.
Dentalium occidentale, var. *sulcatum* V. vi, 217.
B. range, 75 to 1255 f.*
Dentalium, sp., *g.* vi, 217.
B. range, 1731 to 2033 f. Southern.
Dentalium, sp., *h.* vi, 217.
B. range, 843 f.†; 2033 f.* Southern.
Siphodentalium vitreum M. Sars. v, 557, pl. 42, f. 19.
B. range, 100 f.†; 349 to 1290 f.* N., Arc., Eu.
Siphodentalium teres Jeff. vi, 218.
B. range, 843 f.†; 858 to 1290 f.* Eu.
Siphonentalis affinis (Sars). v, 558, pl. 42, f. 20, *a*, *b*.
B. range, 349 to 365 f.†; 499 to 1731 f.* N., Eu., Azores.
Siphonentalis Lofotensis Sars. v, 558.
B. range, 115 f.*; 365 to 480 f.† N., Eu.
Cadulus Pandionis V. and S. v, 558, pl. 58, f. 30, 30*a*.
B. range, 85 to 487 f.*; 516 f.† (? Eu., Med., Af.)
Cadulus Watsoni Dall. vi, 219.
B. range, 197 to 938 f.†; 547 to 843 f.* Cb.
Cadulus grandis V. vi, 219.
B. range, 843 to 1467 f.†; 906 to 1098 f.*
Cadulus Jeffreysii ? (Monteros.) v, 559; vi, 257.
B. range, 115 f.*; 516 to 843 f.† Eu., Azores.
Cadulus propinquus ? G. O. Sars. v, 558, pl. 58, f. 31, 32; vi, 257.
B. range, 100 to 115 f.† Eu., Med.
Cadulus cylindratus Jeff. vi, 220.
B. range, 1608 f. Eu.

LAMELLIBRANCHIATA.

Teredo megotara Hanley.
B. range, 55 f.†; 100 to 1467 f.*; surface* in wood. S., O., Eu.
Xylophaga dorsalis (Turt.) F. and Han. v, 559, pl. 44, f. 9.
B. range, 32 to 2033 f. N., Eu., Med.
Ensatella Americana (Gld.) V.
B. range, 0 to 28½ f.*; 64 to 89 f.† N., S.
Mya truncata Linné.
B. range, 15 to 110 f.† N., Arc., Eu., P.
Saxicava Norvegica (Speng.) Woodw.
B. range, 20 to 506 f.†; 300 f.* N., Arc., Eu., P.
Cyrtodaria siliqua (Speng.) Woodw.
B. range, 28 to 258 f.† N., Arc.
Poromya granulata (Nyst.) F. and Han. v, 564, pl. 44, f. 3, 4.
B. range, 64 to 146 f.†; 93 to 120 f.* N., Eu., Med., Cb.
Poromya granulata, var. *rotundata* (J.) v, 565.
B. range, 64 to 115 f. N., Eu.
Poromya sublevis V. vi, 221, pl. 32, f. 21.
B. range, 1917 f.† Off Chesapeake Bay.
Neæra obesa Lovén. v, 563, pl. 44, f. 10, *c*.
B. range, 192 to 1290 f.; 20 to 150 f. N. of Cape Cod. N., Arc., Eu., Azores.
Neæra glacialis G. O. Sars. v, 562, pl. 44, f. 10, *a*, *b*.
B. range, 64 to 547 f. N., Arc., Eu.
Neæra rostrata (Speng.) Lovén. v, 562, pl. 58, f. 39.
B. range, 65 to 487 f.†; 85 to 155 f.* N., Eu., Med., Af., Azores, Cb., Patagonia.
Neæra lamellosa M. Sars. v, 561; vi, pl. 30, f. 3.
B. range, 319 to 547 f. Eu., Med., Af.
Neæra multicostata V. and S. v, 559, pl. 58, f. 40.
B. range, 85 to 158 f. (? Arc., Eu., Med.)
Neæra multicostata, var. *curta* (J.). v, 560.
B. range, 115 to 120 f.† Eu., Azores, Bermudas, P.
Neæra perrostrata (Dall). v, 561.
B. range, 85 to 325 f. Cb.
Neæra gigantea V. vi, 223.
B. range, 1917 f.† Off Chesapeake Bay.
Neæra undata V. vi, 223.
B. range, 2221 f.† Off Chesapeake Bay.
Neæra, sp.
B. range, 142 f. Off Cape Hatteras.
Kennerlia glacialis (Leach) Carp. v, 567.
B. range, 63 to 100 f. N., Arc., Eu.
Clidiophora trilineata (Say) Carp.
B. range, 0 to 29 f.*; 45 to 126 f.† N., S.
Periploma papyracea (Say) Con.
B. range, 7 to 1255 f. N.

Cochlodesma Leanum Couth.
B. range, 2 to 20 f.*; 65 f.† S.
Thracia Conradi Couth.
B. range, 4½ to 193 f.†; 34 f.* N.
Thracia nitida V. vi, 221, pl. 32, f. 22.
B. range, 1917 f. Off Chesapeake Bay.
Pecchiolia abyssicola Sars. v, 565.
B. range, 192 to 487 f.*; 516 to 1290 f.† N., Arc., Eu.
Pecchiolia gemma V. v, 565; vi, 258, pl. 30, f. 7, 8.
B. range, 75 to 1290 f.†; 499 to 906 f.*
Verticordia cælata V. v, 566; vi, pl. 30, f. 9, 9*a*.
B. range, 100 f.†
Mytilimeria flexuosa V. and S. v, 567, pl. 58, f. 38; vi, 258.
B. range, 75 to 319 f.†; 349 f.*
Pholadomya arata V. and S. v, 567, pl. 58, f. 37; vi, pl. 30, f. 4–6.
B. range, 71 to 134 f.† Eu.
Spisula solidissima Gray.
B. range, 0 to 192 f.†; 0 to 18 f.* N., S.
Spisula ovalis Gould.
B. range, 5 to 71 f.†; 8½ to 15 f.* N.
Ceronia arctata (Con.) Ad.
B. range, 0 to 183 f.†; 0 to 2 f.* N.
Abra lioica (Dall) V. v, 568; vi, 224.
B. range, 100 f.*; 115 f.† Cb.
Abra longicallis (Scacchi). vi, 224.
B. range, 1467 f.† Eu., Med., Canaries, Af., Azores, Cb.
Macoma sabulosa (Speng.) Mörch.
B. range, 30 to 208 f.†; 29 to 1255 f.* N., Arc., Eu., P., As.
Macoma, sp.
B. range, 100 f.†
Callista convexa (Say) Ad.
B. range, 0 to 21¼ f.*; 85 f.† N., S.
Cyprina Islandica (Linné) Lam.
B. range, 8 to 128 f.*; 130 to 349 f.† N., Arc., Eu.
Astarte castanea Say.
B. range, 0 to 100 f.*; 142 to 435 f.† N., S.
Astarte quadrans Gld.
B. range, 11 to 100 f. N.
Astarte undata Gld.
B. range, 8 to 480 f. N.
Astarte crenata Gray.
B. range, 34½ to 640 f. N., Arc., Eu., As.
Venericardia granulata (Say) = *borealis* Con. v, 572; vi, 258.
B. range, 8 to 435 f.†; 9 to 192 f.* N.
Cardium pinnulatum Conrad.
B. range, 1 to 266 f. N.
Cardium peramabilis Dall. v, 569.
B. range, 115 f.† Cb.

Loripes lens V. and S. v, 569; vi, 259.
B. range, 5 to 192 f.†; 120 f.* N.
Lucina filosa Stimp.
B. range, 4 to 349 f.†; 20 to 30 f.* N.
Cryptodon subovatus (J.) V. v, 570.
B. range, 480 f.†; 499 f.* Eu., Af.
Cryptodon Gouldii (Phil.) Stimp.
B. range, 6 to 1467 f. N., Eu.
Cryptodon obesus V. v, 569.
B. range, 12 to 100 f.†; 115 to 1290 f.* N.
Cryptodon ferruginosus (Forbes). v, 570.
B. range, 100 to 1467 f. N., Arc., Eu., Med.
Cryptodon tortuosus (Jeff.). vi, 226.
B. range, 499 to 1290 f. Eu.
Axinopsis, sp. nov.
B. range, 1451 f.
Diplodonta turgida V. and S. v, 569, pl. 58, f. 42; vi, pl. 30, f. 10, 11.
B. range, 65 to 98 f.†
Montacuta ovata Jeff. v, 571.
B. range, 8½ to 157 f.† Eu.
Montacuta tumidula Jeff. vi, 225.
B. range, 843 to 1091 f. Southern. Eu.
Kelliella, sp. nov.
B. range, 2033 f.
Solemya velum Say.
B. range, 0 to 10 f.*; 9 to 115 f.† N., S.
S. velum, var. *borealis* (Totten).
B. range, 1 to 349 f.†; 56 to 300 f.* N., S.
Yoldia thraciformis (Storer) Stimp.
B. range, 29 to 182 f.†; 192 to 906 f.* N.
Yoldia sapotilla (Gld.) Stimp.
B. range, 4½ f.†; 12½ to 321 f.* N., Arc.
Yoldia limatula (Say) Woodw.
B. range, 3½ to 252 f. N., S.
Yoldia expansa Jeff.
B. range, 365 f.*; 1451 to 1467 f.† Eu.
Yoldia lucida Lovén. v, pl. 44, f. 1.
B. range, 29 to 1608 f.†; 115 to 1290 f.* N., Arc., Eu., Med.
Yoldia frigida Torell. v, 573, pl. 44, f. 2.
B. range, 157 to 1255 f. N., Arc., Eu., Med., As.
Yoldia Jeffreysi (Hidalgo). vi, 229.
B. range, 349 f.*; 499 to 1290 f.† Eu., Med., Af., Azores, Cb.
Yoldia subequilatera (Jeff.). vi, 229.
B. range, 499 to 1731 f. Eu., Arc.
Yoldia regularis V. vi, 228.
B. range, 349 f.†
Yoldia sericea Jeffreys, var. *striolata* J. vi, 226.
B. range, 516 to 1731 f. Eu.

Yoldia Messanensis (Seguenza), var. vi, 227.
B. range, 1451 to 2033 f.†; 1467 f.* Eu., Med., Azores, Cb.
Leda acuta (Conrad). v, 572, pl. 58, f. 41; vi, 259, pl. 30, f. 15.
B. range, 64 to 225 f.†; 65 to 115 f.* S. (? Eu., Med.)
Leda Bushiana V. vi, 229.
B. range, 516 f. Off Cape Hatteras.
Leda pernula (Müll.). v, 572; vi, pl. 30, f. 14, 14*a*.
B. range, 216 f.†; 300 to 349 f.* N., Arc., Eu., P.
Leda tenuisulcata (Couth.) Stimp.
B. range, 25 to 120 f.†; 640 f.* N.
Phaseolus ovatus ? (Jeff. MSS.). vi, 230.
B. range, 1290 f. (? Eu.)
Malletia obtusa (M. Sars) Mörch. vi, 226.
B. range, 516 f.†; 788 to 1608 f.* Eu.. Med.
Glomus nitens Jeff. vi, 231.
B. range, 1608 f.† Eu.
Nucula delphinodonta Mighels.
B. range, 10 to 1290 f. N., Arc., Eu.
Nucula proxima Say.
B. range, 3½ to 302 f.*; 310 to 516 f.† S.
Nucula tenuis (Mont.) Turton.
B. range, 75 to 266 f.†; 302 to 1255 f.* N., Arc., Eu., Med., Cb., P., As.
Nucula cancellata Jeff. vi, 231.
B. range, 858 f.†; 906 to 2033 f.* Eu., Azores.
Nucula granulosa Verrill, sp. nov.‡
B. range, 487 to 858 f.*
Arca pectunculoides Sc. v, 573, pl. 44, f. 6.
B. range, 79 to 640 f. N., Eu., Med., Cb.
Arca pectunculoides, var. *septentrionalis* Sars. v, 573.
B. range, 79 to 640 f. N., Arc.
Arca pectunculoides, var. *Frielei* (Jeff.). v, 574.
B. range, 156 to 487 f. N., Eu., Med.
Arca pectunculoides, var. *crenulata* V. v, 575.
B. range, 85 to 120 f.
Limopsis minuta (Phil.). v, 576.
B. range, 64 to 115 f.†; 120 to 2221 f.* N., Arc., Eu., Med., Af., Azores.
Limopsis cristata Jeff. v, 577; vi, 231.
B. range, 549 f.† Eu., Med.
Limopsis, sp.
B. range, 197 to 2221 f.

‡ *Nucula granulosa* V. A small species, 2·5^{mm} long, 2^{mm} broad, broad ovate, with the beaks anterior and turned forward, posterior end rounded, anterior tip angularly truncated, a well defined and rather large lunule bordered by an angular ridge. Surface greenish yellow, dull, closely covered with microscopic granules, and with fine lines of growth. Margin plain, thickened. Hinge-margin rather stout, curved, with about 5 anterior and 7 posterior teeth, which are relatively strong. Cartilage-pit large. Stations 892, 1880; 2072, 1883.

Limopsis tenella Jeff. vi, 232.
B. range, 1731 to 2033 f. Eu.
Mytilus edulis Linnê.
B. range, 0 to 57½ f.* (perhaps from surface *Fuci*); 1608 f.† Oc., S., N., Arc., Eu., Med., P., Antarctic.
Modiola modiolus (Linné) Turton.
B. range, 0 to 115 f.*; 202 f.† N., Arc., Eu., P., As.
Modiolaria nigra (Gray) Lovén.
B. range, 0 to 27½ f.*; 31 to 65 f.† N., Arc., Eu., P.
Modiolaria discors (Linné) Lovén.
B. range, 15 to 90 f. N., Arc., Eu., Med., P., As.
Modiolaria corrugata (Stimp.) Mörch.
B. range, 18 to 45 f.*; 20 to 25 f.† N., Arc., Eu.
Modiolaria polita V. and S. v, 578; vi, pl. 30, f. 12.
B. range, 238 to 321 f. Cb., Eu.
Crenella glandula (Totten) Ad.
B. range, 0 to 11 f.†; 5 to 100 f.* N.
Crenella decussata (Mont.) Macg. v, 578, pl. 44, f. 7.
B. range, 5 f.†; 11 to 115 f.* N., Arc., Eu., Cb., P.
Idas argenteus Jeff. v, 579; vi, pl. 30, f. 16, 16*a*.
B. range, 335 to 2033 f.* on wood. Surface ? (on wood). Eu.
Dacrydium vitreum (Möll.) Torrell. v, 579, pl. 44, f. 8, 8*a*.
B. range, 300 f.†; 312 to 1555 f.* N., Arc., Eu., Med., Af., Azores.
Pecten Clintonius Say. vi, 261.
B. range, 8 to 349 f.†; 13 to 146 f.* N.
Pecten Islandicus Müller.
B. range, 33 to 122 f.*; 124 to 194 f.† N., Arc., Eu., P., As.
Pecten glyptus V. v, 580.
B. range, 69 to 156 f.†
Pecten striatus Müller. vi, 233.
B. range, 100 f.† Eu., Med.
Pecten vitreus (Gmel.) Wood. v, 581, pl. 42, f. 21.
B. range, 57½ to 64 f.†; 100 to 787 f.* N., Arc., Eu., Med., Af.
Pecten pustulosus V. v, 581, pl. 42, f. 22, 22*a*; vi, 261.
B. range, 99½ to 321 f.*; 365 to 547 f.† N., Eu.?
Pecten leptaleus V. vi, 232.
B. range, 142 f. Off Cape Hatteras.
Pecten fragilis Jeff. vi, 232.
B. range, 843 f. Off Cape Hatteras. Arc., Eu., Azores.
Amussium, sp. nov. v, 582; vi, 261.
B. range, 79 f.†; 86 to 317 f.*
Limæa subovata (Jeff.) Monteros. v, 580.
B. range, 100 to 1362 f.†; 252½ to 1290 f.* Eu., Arc., Med., Azores.
Avicula hirundo (L.). v, 582.
B. range, 71 f.*; 89 f.† Eu., Med., Can., Azores, Cb., Oc.
Avicula hirundo, var. *nitida* V. v, 582, pl. 58, f. 43.
B. range, 64 to 192 f. Oc.
Avicula squamulosa ? Lam. vi, 233.
Surface.* S., Oc.

Anomia aculeata Müll.
B. range, 4 to 640 f. N., Arc., Eu.

BRACHIOPODA.

Terebratulina septentrionalis (Couth).
B. range, 16 to 396 f. N., Arc., Eu., Af.
Waldheimia cranium (Müller) Davidson. vi, 234.
B. range, 1362 f.†. Arc., Eu., P.
Discina Atlantica King. vi, 233.
B. range, 1251 to 1467 f.† Eu., Arc., Med., Australia.

List of Species found between 1000 *and* 2000 *fathoms.*

The following list comprises those of the species above enumerated which we have dredged between 1000 and 2000 fathoms, with the observed bathymetrical range in this region. Those printed in Italics have not been taken by us in less than 1000 fathoms.

CEPHALOPODA.

	Fathoms.		Fathoms.
Ommastrephes illecebrosus V.	0–1022	Desmoteuthis tenera V.	369–1346
Mastigoteuthis Agassizii V.	640–1050	Alloposus mollis V.	238–1735
Chiroteuthis lacertosa V.	435–2221	*Octopus piscatorum* V.	1362
Leptoteuthis diaphana V.	1731	*Octopus gracilis* V.	1290
Calliteuthis reversa V.	365–2369	Eledone verrucosa V.	787–1255

GASTROPODA.

Toxoglossa.	Fathoms.	Toxoglossa.	Fathoms.
Admete Couthouyi (Jay) Ad.	155–1255	Bela pygmæa V.	312–1290
Pleurotomella Agassizii V.	39–1608	*Bela Rathbuni* V.	1395
Pleurotomella Bairdii V.	1608–2221	*Spirotropis ephamilla* V.	1917–2221
Pleurotomella Benedicti V. & S.	1290	*Typhlomangilia Tanneri* V. & S.	1290
Pleurotomella Sandersoni V.	1290–2033	*Taranis Mörchii*, v. *tornatus* V.	1255
Pleurotomella Saffordi V. & S.	843–1608		
Pleurotomella bandella Dall	1290–2033	Rachiglossa.	
Pleurotomella Emertoni V.	1917	Buccinum abyssorum V. & S.	49–1309
Pleurotomella Bruneri V.	1608–2033	*Sipho profundicola* V. & S.	1497–2033
Pleurotomella Catharinæ V.	843–2033	*Sipho profundicola*, var. *dispar* V.	1555
Gymnobela engonia V.	906–1608	Sipho cælatus, var. hebes V.	640–1255
Gymnobela curta V.	843–1917	Sipho (Mohnia) cælatulus V.	516–1290
Gymnobela curta, var. subangulata V.	197–2033	Trophon clavatus Sars	843–2033
Gymnobela hebes V.	252–2033	Astyris pura V.	71–1255

TÆNIOGLOSSA.	Fathoms.
Benthodolium abyssorum V. & S.	1395–1221
Natica clausa Brod. & Sowerby	13–1255
Lunatia Grœnlandica (Möll.) H. & A. Ad.	12½–1290
Lamellaria pellucida, var. Gouldii V.	44–1497
Trichotropis inflata Friele	1290
Cingula Jan-Mayeni V.	238–1290
Cingula apicina V.	1608
Cingula brychia V.	349–1290
Cithna cingulata V.	906–1467
Cithna (?) olivacea V.	193–1290
Aporrhais occidentalis Beck.	34–1000
Seguenzia formosa Jeff.	1290–2033
Seguenzia eritima V.	1290–2033
RHIPHIDOGLOSSA.	
Margarita regalis V. & S.	64–1555
Cyclostrema diaphanum V.	1290–2033
Puncturella (Fissurisepta) eritmeta V.	1451
Propilidium elegans V.	1395
Cocculina leptalea V.	1495–2033
GYMNOGLOSSA.	
Stilifer Stimpsoni V.	13–1255
Stilifer curtus V.	410–1255
Eulima stenostoma Jeff.	843–1467
Turbonilla Rathbuni V.	64–1395
Turbonilla Bushiana V.	365–1467
TECTIBRANCHIATA.	
Actæon nitidus V.	238–1451
Scaphander nobilis V.	906–1309
Scaphander puncto-striatus (Migh.) H. & A. Ad.	46–1467
Diaphana gemma V.	100–2033
Cylichna alba (Brown) Lovén	12–1290
Cylichna Dalli V.	452–1290
Cylichna occulta (Migh.) H. & A. Ad.	100–1608

SCAPHOPODA.

	Fathoms.
Dentalium solidum V.	843–1309
Dentalium striolatum Stimp.	25–1255
Dentalium occidentale Stimp.	26–1255
Dentalium occidentale, var. sulcatum V.	75–1255
Dentalium, sp. *g.*	1731–2033
Dentalium, sp. *h.*	843–2033
Siphonodentalium vitreum M. Sars	100–1290
Siphonodentalium teres Jeff.	843–1290
Siphonentalis affinis (Sars)	349–1731
Cadulus grandis V.	843–1467
Cadulus cylindratus V.	1608

LAMELLIBRANCHIATA.

	Fathoms.
Teredo megotara Han. surface and	55–1467
Xylophaga dorsalis F. & Han.	32–2033
Poromya sublevis V.	1917
Neœra gigantea V.	1917
Neœra obesa Lovén	20–1290
Periploma papyracea (Say) Con.	7–1255
Thracia nitida V.	1917
Pecchiolia abyssicola Sars	192–1290
Pecchiolia gemma V.	75–1290
Abra longicallis (Scacchi)	1467
Macoma sabulosa (Speng.) Mörch.	29–1255
Cryptodon tortuosus Jeff.	499–1290
Cryptodon Gouldii (Phil.) Stimp.	6–1467
Cryptodon obesus V.	12–1290
Cryptodon ferruginosus (Forbes)	100–1467
Axinopsis, sp. nov.	1451
Montacuta tumidula Jeffreys	843–1091
Malletia obtusa (M. Sars) Mörch.	516–1608
Nucula delphinodonta Mighels	9–1290
Nucula tenuis (Mont.) Turton	75–1255
Nucula cancellata Jeffreys	858–2033
Yoldia Messanensis (Seguenza), variety	1451–2033
Yoldia expansa Jeffreys	365–1467

	Fathoms.
Yoldia sericea, var. striolata Jeffreys	516–1731
Yoldia lucida Lovén	29–1608
Yoldia frigida Torell	157–1255
Yoldia subequilatera (Jeff.)	499–1731
Yoldia Jeffreysii (Hidalgo)	349–1290
Phaseolus ovatus ? (Jeff. MSS.)	1290
Glomus nitens Jeffreys	1608
Limopsis minuta (Phil.)	64–2221
Limopsis, sp.	197–2221
Limopsis tenella Jeffreys	1731–2033
Idas argenteus Jeff.	335–2033
Dacrydium vitreum (Möll.)	300–1555
Limæa subovata (Jeffreys)	100–1362

BRACHIOPODA.

	Fathoms.
Discina Atlantica King	1251–1467
Waldheimia cranium (Müller) Davidson	1362

List of Species dredged by the U. S. Fish Commission at depths exceeding 2000 *fathoms.*

Those species in Italic type were not taken in less than 2000 fathoms. A dagger (†) after a depth indicates that the specimens were dead shells only.

CEPHALOPODA.

	Fathoms.
Chiroteuthis lacertosa V.	435–2221 (2949)
Calliteuthis reversa V.	365–2369
Eledonella pygmæa V.	2949

GASTROPODA.

TOXOGLOSSA.

	Fathoms.
Pleurotomella Bairdii V. & S.	1608–2221†
Pleurotomella Sandersoni V.	1290–2033
Pleurotomella bandella D.	1290–2033
Pleurotomella Bruneri V.	1608–2033
Pleurotomella Catharinæ V.	843–2033
Gymnobela curta, var. subangulata V.	197–2033†
Gymnobela hebes V.	252–2633†
Spirotropis ephamilla V.	1917–2221

RACHIGLOSSA.

Sipho profundicola V. & S.	1497–2033
Sipho hispidulus V.	2033
Trophon clavatus Sars	843–2033

TÆNIOGLOSSA.

	Fathoms.
Benthodolium abyssorum V. & S.	1395–2221
Cithna tenella, var. *costulata* Jeff.	2033
Seguenzia formosa Jeffreys	1290–2033
Seguenzia formosa, var. *nitida* V.	2033
Seguenizia eritima V.	1290–2033

RHIPHIDOGLOSSA.

Cyclostrema diaphanum V.	1290–2023†
Cocculina leptalea V.	1395–2033

GYMNOGLOSSA.

Eulimella chariessa V.	2033
Eulimella lucida V.	2033
Eulimella nitida V.	2033†

TECTIBRANCHIATA.

Diaphana gemma V.	100–2033

SCAPHOPODA.

	Fathoms.		Fathoms.
Dentalium, sp. *g.*	1731–2033	*Dentalium*, sp. *h*	843–2033

LAMELLIBRANCHIATA.

	Fathoms.		Fathoms.
Xylophaga dorsalis F. & Han.	32–2033	Nucula cancellata Jeffreys	858–2033
Neæra undata V.	2221+	Limopsis minuta Phil.	64–2221
Kelliella, sp. nov.	2033	Limopsis, sp.	197–2221
Yoldia Messanensis (Seguenza)	1451–2033+	Limopsis tenella Jeffreys	1731–2033
		Idas argenteus Jeff.	335–2033

Species also taken by the Blake Expeditions in the Gulf of Mexico, Caribbean Sea, or Straits of Florida.

The following species have been recognized by Mr. Dall, among the Blake shells, or else have been identified by the writer with those recorded by him, or by personal comparison of specimens. Probably other cases of identity will occur when the whole of the Blake collections shall have been fully studied. The identity of some of these is still doubtful.

Abralia megalops Verrill.
Pleurotoma comatotropis Dall.
Daphnella limacina (Dall).
Pleurotomella bandella Dall.
Pleurotomella Emertoni Verrill.
Taranis Mörchii (Malm) Jeffreys.
Seguenzia formosa Jeffreys.
Actæon melampoides Dall.
Ringicula nitida Verrill.
Leptothyra induta Watson.
Calliostoma Bairdii Verrill & Smith.
?Margarita lamellosa Verrill & Smith (?= M. ægleës Watson, Dall).
Cadulus Watsoni Dall.
Poromya granulata (Nyst) Forbes & Hanley.
Neæra perrostrata Dall.
?Neæra multicostata Verrill & Smith (?= N. alternata (D'Orb.) Dall.
Neæra rostrata (Spengler) Lovén.
Abra longicallis (Scacchi).
Abra lioica (Dall) V.
Cardium peramabilis Dall.
?Cryptodon obesus Verrill.
?Leda acuta Conrad (?= L. Jamaicensis Dall).
Yoldia Messanensis (Seguenza).
Yoldia Jeffreysii (Hidalgo).
Arca pectunculoides Scacchi.
Nucula tenuis (Mont.) Turton.
Limopsis minuta (Philippi).
Limopsis tenella Jeffreys.
Limopsis cristata Jeffreys.
Modiolaria polita Verrill and Smith.
Crenella decussata (Mont.) Macg.
Ammusium, sp. nov.

I.—*Summary of Mollusca included in the preceding lists.*

Named varieties are here counted as if distinct species.	Cephalopoda.	Gastropoda.	Pteropoda.	Scaphopoda.	Lamellibranchiata.	Brachiopoda.	Total.
Shallow water species inhabiting the zone between 60 and 200 fathoms	2	35		2	46	1	86
" " " 200 " 500 "	2	31		2	27	1	63
" " " 500 " 1000 "	1	11		2	16		30
" " " 1000 " 1500 "	1	7		2	9		19
Deep water species " " 60 " 200 "	8	89		7	39		143
" " " 200 " 500 "	13	76		7	32		128
" " " 500 " 1000 "	14	65		10	29		118
" " " 1000 " 2000 "	9	49		9	27	2	96
" " " 2000 " 3000 "	3	22		2	8		35
Total deep water species	23	166		14	68	2	273
Total shallow water species (4 are also pelagic)	2	38		2	46	1	89
Total surface or pelagic species	2	14	23		3		42

II.—*Table illustrating Bathymetrical Distribution.*

All the species and named varieties are counted together, whether of shallow or deep water origin, except in the second column. Those species that have not been found in this region in more than 60 fathoms are not included in the eighth column, otherwise the entire molluscan fauna, living between the shore and 60 fathoms, would have to be enumerated.

	Species and varieties.	Total species.	2000–3000 f.	1000–2000 f.	500–1000 f.	200–500 f.	60–200 f.	0–60 f.	At surface.
CEPHALOPODA	27	27	3	10	15	15	10	2	2
GASTROPODA	216	205	22	56	76	107	124	38	14
Toxoglossa	36	34	8	19	13	15	12	4	0
Rachiglossa	33	29	3	7	16	21	25	7	0
Tœnioglossa	38	35	5	13	11	20	23	11	1
Ptenoglossa	10	10	0	0	3	3	7	0	1
Rhiphidoglossa	30	28	2	5	13	17	14	2	0
Gymnoglossa	20	20	3	5	5	8	11	1	0
Tectibranchiata	23	23	1	7	13	15	19	5	0
Nudibranchiata	13	13	0	0	0	5	8	7	4
Polyplacophora	5	5	0	0	2	3	5	1	0
Heteropoda	8	8							8
PTEROPODA	24	23							23
SOLENOCONCHA	16	15	2	11	12	9	8	2	0
LAMELLIBRANCHIATA	115	107	8	36	45	59	85	46	3
BRACHIOPODA	3	3	0	2	0	1	1	1	0
Total Mollusca and Brachiopoda	401	380	35	115	148	191	228	89	42

III.—*Table showing the Progress of Discovery of our deep water Mollusca.*

	Cephalopoda.	Toxoglossa.	Rachiglossa.	Taenioglossa.	Ptenoglossa.	Rhiphidoglossa.	Polyplacophora.	Gymnoglossa.	Tectibranchiata.	Nudibranchiata.	Heteropoda.	Pteropoda.	Scaphopoda.	Lamellibranchiata.	Brachiopoda.	Total.
Species and named varieties in list	27	36	33	38	10	30	5	20	23	13	8	24	16	115	3	401
Recorded before 1880	11	5	11	13	1	4	2	2	8	6	1	5	3	52	1	125
Added since 1880	16	31	22	25	9	26	3	18	15	7	7	19	13	63	2	276
Added in 1883	4	17	13	14	0	15	0	7	2	0	5	10	8	24	2	121
Described as new by the writer since 1880	15	26	21	18	8	18	1	13	9	3	1	2	4	19	0	158
Described as new by the writer since 1883	4	16	11	10	0	11	0	6	1	0	1	0	3	9	0	72

In the above list are included 380 species and 21 named varieties. But of these, at least 42 are pelagic species, taken either alive at the surface or dead at the bottom, viz: Cephalopoda, 2; Tænioglossa, 1; Ptenoglossa, 1; Nudibranchiata, 4; Heteropoda, 8; Pteropoda, 23; Lamellibranchiata, 3. Possibly a few other species, now considered as deep-water forms, may be pelagic, for it is difficult to tell at what depths free-swimming species of Cephalopods are taken, unless they also occur in the stomachs of deep sea fishes. Many small Gastropods, etc., living habitually on floating *Fucus* and *Sargassum*, are caught with these sea-weeds in the trawl, on its way up or down, and mingling with the shells from the bottom may give rise to errors of this kind. Thus some of the species of *Rissoa*, *Cingula*, *Cithna*, etc., may not really live at the depths recorded, but at the surface. When satisfied of this accidental occurrence of some of the common shore species (Littorina, etc.), I have omitted them from the list, but have included the strictly pelagic forms, like *Litiopa*, for convenience.

Of the 343 species and 19 named varieties regarded as living at the bottom, 89 are also shallow-water species, living habitually in less than 60 fathoms, on this part of the coast. A considerable number, now considered as deep-water species in this region, occur in shallow water north of Cape Cod, and some of them may eventually be found to occur in the cold belt, off Martha's Vineyard, in 25 to 60 fathoms.

Of the 89 shallow-water species, 63 occur also between 200 and 500 fathoms, and 19 below 1000 fathoms. Some of these have a remarkably great range geographically, as well as in depth.

Of the 259 species and 14 varieties regarded as belonging to the deep-water fauna, in this region, 143 occur in the comparatively warm zone, between 60 and 200 fathoms. A considerable number of these have been taken only in the more southern dredgings, off Chesapeake Bay and Cape Hatteras, and some of them only in depths not much exceeding 100 fathoms, where the Gulf Stream has the greatest effect. In this zone the southern genera, *Dolium*, *Marginella*, *Solarium*, *Avicula*, etc. occur. The number that occupy the zone between 200 and 500 fathoms is 128, besides 63 shallow-water species, while 118 inhabit the depths between 500 and 1000 fathoms, associated with 30 shallow-water forms, and 96 have been taken between 1000 and 2000 fathoms, associated with 19 shallow-water ones. Although but five of our dredgings have been in more than 2000 fathoms, we are able to record 35 species from between 2000 and 3000 fathoms, which is a much greater number than has hitherto been recorded from such depths in the north Atlantic.

The different groups of mollusca differ greatly in the relative proportion of deep and shallow-water species, as shown by the following tables. Thus the deep-water Cephalopods are 23, against 4 shallow-water and surface species. The Gastropods exclusively deep-water are 166, against 38 of shallow-water origin. The shallow-water Lamellibranchs, however, seem to have a much greater tendency to range into deep-water, for of these there are but 68 deep-water species, associated with 46 shallow-water ones.

The species and varieties described as new, in this paper, are 72, as follows: Cephalopoda, 4; Gastropoda, 56; Solenoconcha, 3; Lamellibranchiata, 9. The total number of species of mollusca added to the fauna of this region by the Fish Commission dredgings, since 1880, is about 300, but only 276 of these are included in the above list; of these 121 were obtained in 1883.

Among the peculiarities of the deep-water mollusca the occurrence of an unusual proportion of Toxoglossa, many of which are handsomely sculptured and of large size, is a noteworthy feature. Tectibranchs are also abundant and some of them large. Rhiphidoglossa are also relatively abundant and present some striking and elegant forms of Trochidæ, while there are 13 limpet-like forms belonging to this group, including the genera *Cocculina*, *Addisonia*, *Lepetella*, *Propilidium*. The Solenoconcha or Scaphopoda are relatively much more abundant, and some of the species are much larger in 500 to 2000 fathoms than in shallow-water. This must be regarded as mainly a deep-sea group.

Among Lamellibranchs the groups that are relatively most numerously represented are the Anatinidæ and Corbulidæ, (especially the genus *Neæra*); the Nuculidæ, including the genera *Nucula*, *Leda*, *Yoldia*, *Malletia Glomus*, etc.; and the Arcidæ, including *Arca* and *Limopsis*. The Lucinidæ and Pectenidæ are also well represented.

ERRATA.

Page 152, line 23, for Diomedeæ, read bandella Dall (see p. 250).

Page 160, line 9, and page 226, line 23, for *Bela hebes* read *Gymnobela hebes.* An examination of the animal shows that this species has no operculum. The nucleus is imperfect in all of our specimens. It is closely allied to *G. curta.* The latter may prove to be only a variety, when larger series can be compared.

Page 163, line 34, for Typhlomangelia read Typhlomangilia.

Page 175, line 26, for figure 14, read figure 16.

Page 193, lines 10 and 15, and page 194, line 33, for charissa, read chariessa.

Page 218, line 23, for 35165, read 35163.

Page 238, line 6, for 306, read 302.

Page 250, lines 2 and 25, for 1881, read 1882.

ERRATA FOR VOL. V.

The following errata have been noticed in the former catalogue.

Page 448, line 15, for Sept. 15, read Sept. 13.

Page 511, line 7 from bottom, for Mörch, read Möll.

Page 520, line 23, for umbiblical, read umbilical.

Page 523, lines 1, 2, for bombix, read bombyx.

Page 529, lines 27, 28, for Atalanta, read Atlanta.

Page 529, last line, for Bolton, read Bolten.

Page 535, line 21, add off Halifax, 190 fath.; off Block I., 6–15 fath., 1874.

Page 539, line 9, for *Plasianella*, read *Phasianella.*

Page 540, last line, for perisotraca, read periostraca.

Page 551, line 8, read Cape Breton Island.

Page 553, line 12, for Galvinia, read Galvina.

Page 567, line 31, before Leche, insert Nova Zembla and Kara Sea.

Page 572, line 9, for *Nova-angliæ*, read *Novangliæ.*

Page 578, line 18, for mytilus, read Mytilus.

EXPLANATION OF THE PLATES.

Plate XXVIII.

Figure 1.—*Argonauta argo* Linné, p. 247. From an alcoholic specimen taken off Long Island. Side view; natural size.

Figure 1*a*.—Front view of the shell of the same specimen; natural size.

Figure 1*b*.—Side view of the same shell.

Figure 2.—*Abralia megalops* V., p. 143. Type specimen. Front view of one of the sessile arms; × 2 diameters.

Figure 3.—*Pleuropus Hargeri* V., p. 275. Type specimen. Side view of the shell and animal in alcohol; enlarged.

Figure 4.—*Atlanta Peronii* Les., p. 274. Side view of a large but somewhat broken specimen; × 8 diameters.

Figure 4*a*.—The same. Front view; × 8 diameters. The nucleus is broken.

Figure 5.—*Heterodoris robusta* V. and E., p. 274. Type specimen. Dorsal view natural size.

Figure 5*a*.—The same. Ventral view; natural size.

Figure 6.—*Doris complanata* V. and E., p. 274. Dorsal view of a specimen having the gills partially retracted; one-half natural size.

Figure 7.—*Koonsia obesa* V., p. 274. Dorsal view of a specimen a short time in alcohol, but having the dorsal portion of the body much contracted, while the gill and reproductive organs are more displayed than usual; one-half natural size.

Figure 8.—*Cœcum Cooperi* Smith. Dorsal view of the extended animal and front part of the shell from a living specimen; enlarged about 12 diameters.

Plate XXIX.

Figure 1.—*Trophon Lintoni* V., p. 176. Type specimen. Front view; × 2 diameters.

Figure 2.—*Dolium Bairdii* V. and S., p. 253. Front view; natural size.

Figure 2*a*.—The same. Part of the odontophore; × 22 diameters.

Figure 2*b*.—The same. Dorsal view of the partially contracted animal preserved in alcohol.

Figure 3.—*Lunatia levicula* V. Front view of one of the largest specimens taken; natural size.

Figure 4.—*Marginella borealis* V., p. 165. Front view of one of the first specimens taken, which was dead and somewhat eroded; × 2 diameters.

Figure 5.—*Cithna* (?) *olivacea* V., p. 185. Front view of the type specimen; × 8 diameters.

Figure 6.—*Capulus Hungaricus* (Linné), p. 269. Dorsal view of the largest specimen; × 1½ diameters.

Figure 7.—*Pleurotomella Packardii* V., p. 265. Dorsal view of the anterior part of the animal from an alcoholic specimen, male; enlarged about 4 diameters.

Figure 8.—*Taranis pulchella* V., p. 267. Front view of the largest specimen taken; × 8 diameters.

Figure 9.—*Choristes elegans* Carp., var. *tenera* V., p. 256. Top view of a very young specimen; much enlarged.

Figure 9*a*.—The same. Top view of a somewhat older specimen, enlarged to the same extent.

Figure 9*b*.—The same. Basal view of a still older specimen, enlarged the same.

Figure 10.—*Addisonia paradoxa* Dall, p. 256. Part of the odontophore; much enlarged.

Figure 11.—The same. Side view; × 2 diameters.

Figure 11*a*.—Dorsal view of the same specimen; × 2 diameters.

Figure 11*b*.—The same. Ventral view of the animal and shell of a larger specimen in alcohol; × 2 diameters.

Figure 12.—*Cocculina Beanii* Dall, p. 271. Side view; × 8 diameters.

Figure 13.—*Fissurella Tanneri* V., p. 255. Type specimen. Top view; natural size.

Figure 13*a*.—The same specimen, side view.

Figure 14.—*Margarita regalis* V. and S., p. 254. Part of one side of the odontophore; much enlarged.

Figure 15.—*Cylichna Dalli* V., p. 274. Type specimen. Front view; × 4 diameters.

Figure 16.—*Mangilia cerina* V., p. 250. View of a portion of the shell and extended animal from a living specimen; enlarged about 8 diameters.

Figure 16*a*.—The same. Dorsal view of the head and front part of the foot, more extended.

Plate XXX.

Figure 1.—*Placophora Atlantica* V. and S., p. 206. Ventral view of the type specimen; natural size.

Figure 1*a*.—Dorsal view of the same specimen.

Figure 1*b*.—The same. Detached valves; *a*, dorsal side of the anterior valve; *b*, ventral side of the same valve; *c*, dorsal side of one of the middle valves; *d*, dorsal side of the posterior valve, and *e*, ventral side of the same valve; × 2 diameters.

Figure 2.—*Trachydermon exaratus* (Sars), p. 208. Dorsal view; × 2 diameters.

Figure 2*a*.—Ventral view of the same specimen.

Figure 2*b*.—The detached anterior valve of the same specimen; *a*, dorsal side; *b*, ventral side; × 4 diameters.

Figure 3.—*Neæra lamellosa* M. Sars, p. 277. Side view; × 10 diameters.

Figure 4.—*Pholadomya arata* V. and S., p. 278. Anterior view of a large left valve; natural size.

Figures 5, 6.—The same. View of the beak and hinge of two specimens to show variations in the hinge; × 2 diameters.

Figure 7.—*Pecchiolia gemma*, vi, p. 258. Type specimen. View of the interior of the left valve, × 6 diameters.

Figure 8.—The same. View of the exterior of the right valve of a larger example.

Figure 9.—*Verticordia cælata* V., p. 278. Type specimen. View of the exterior; × 8 diameters.

Figure 9*a*.—The same valve, view of the interior; × 8 diameters.

Figure 10.—*Diplodonta turgida* V. and S., p. 279. View of the exterior of the right valve; natural size.

Figure 11.—The same. View of the interior of a somewhat smaller valve; natural size.

Figure 12.—*Modiolaria polita* V. and S., p. 281. Type specimen. Side view of a small specimen; natural size.

Figure 13.—*Tellimya ferruginosa* (Mont.). Side view of a living specimen with the animal fully extended; enlarged about 8 diameters.

Figure 14.—*Leda pernula* (Müll.), p. 280. Side view of a specimen having the beak curved more than usual; × 2 diameters.

Figure 14*a*.—The same specimen. View of the hinge; × 4 diameters.

Figure 15.—*Leda acuta* V., p. 259. Side view; × 3 diameters.

Figure 16.—*Idas argenteus* Jeff., var. *lamellosa* V., p. 281. Side view; × 6 diameters.

Figure 16*a*.—The same. View of the interior of the right valve; × 6 diameters.

Plate XXXI.

Figure 1.—*Pleurotomella Bairdii* V. and S., p. 147. Front view of one of the stouter specimens, ascertained to be a female by examination of the animal; natural size.

Figure 2.—*Pleurotomella Benedicti* V. and S., p. 148; × 2 diameters.

Figure 2*a*.—The same. Apical whorls; × 22 diameters.

Figure 3.—*Pleurotomella Sandersoni* V., p. 149; × 4 diameters.

Figure 3*a*.—The same. Nuclear whorl; × 22 diameters.

Figure 4.—*Pleurotomella Saffordi* V. and S., p. 151; × 3 diameters.

Figure 4*a*.—The same. Nuclear whorls; × 22 diameters.

Figure 5.—*Pleurotomella bandella* (Dall)=*P. Diomedeæ* V. and S., pp. 152 and 250; × 3 diameters.

Figure 5*a*.—The same. Nuclear whorls; × 22 diameters.

Figure 6.—*Pleurotomella Emertoni* V. and S., p. 154; × 2 diameters.

Figure 7.—*Pleurotomella Bruneri* V. and S., p. 155; × 2 diameters.

Figure 7*a*.—The same. Profile view of a younger specimen; × 4 diameters.

Figure 8.—*Typhlomangilia Tanneri* V. and S., p. 163; × 2 diameters.

Figure 9.—*Pleurotomella Catharinæ* V. and S., p. 155; × 4 diameters.

Figure 9*a*.—The same. Nuclear whorls; × 22 diameters.

Figure 10.—*Gymnobela curta* V., p. 158; × 2 diameters.

Figure 11.—*Buccinum abyssorum* V. and S., p. 167; natural size.

Figure 11*a*.—The same. Operculum of another specimen; natural size.

Figure 11*b*.—The same. Dentition.

Figure 12.—*Benthodolium abyssorum* V. and S., p. 177; natural size.

Figure 12*a*.—The same specimen. Operculum; natural size.

Figure 12*b*.—The same specimen. Dentition; × 75 diameters.

Figure 12*c*.—The same. Marginal portion of one of the jaws; × 22 diameters.

Figure 13.—*Sipho profundicola* V. and S., p. 170; natural size.

Figure 14.—*Seguenzia formosa* Jeffreys, p. 186; × 8 diameters.

Figure 14*a*.—The same. Operculum; more enlarged.

Figure 14*b*.—The same. Dentition; × 250 diameters.

Figure 15.—*Seguenzia eritima* V., p. 189; × 8 diameters.

Figure 16.—*Sipho leptaleus* V., p. 175; × 6 diameters.

PLATE XXXII.

Figure 1.—*Leptoteuthis diaphana* V., p. 141. Dorsal view; natural size.

Figure 2.—*Eledonella pygmæa* V., p. 145. Side view of the hectocotylized arm; enlarged about five diameters.

Figure 3.—*Eulimella lucida*, V., p. 192; ×8 diameters.

Figure 3*a*.—The same. View of the upper whorls; ×22 diameters.

Figure 4.—*Eulimella chariessa* V., p. 193; ×8 diameters.

Figure 4*a*, *b*.—The same. Different views of the upper whorls; ×22 diameters.

Figure 5.—*Eulimella nitida* V., p. 194; ×8 diameters.

Figure 6.—*Eulimella lissa* V., p. 195; ×8 diameters.

Figure 7.—*Cithna cingulata* V., p. 184; ×8 diameters.

Figure 8.—*Cingula apicina* V., p. 183; ×4 diameters.

Figure 9.—*Cingula brychia* V., p. 179; ×8 diameters.

Figure 10.—*Cingula leptalea* V., p. 182; ×8 diameters.

Figure 11.—*Cingula syngenes* V., p. 180; ×8 diameters.

Figure 12.—*Turbonilla costulata* V. One of the original type-specimens from Vineyard Sound, shallow water; ×8 diameters.

Figure 13.—*Turbonilla areolata* V. One of the original type-specimens from Vineyard Sound; ×8 diameters.

Figure 14.—*Cyclostrema cingulatum* V., p. 198. Basal view of the type specimen; ×8 diameters.

Figure 15.—*Cyclostrema affine* V., p. 199; ×8 diameters.

Figure 16.—*Cyclostrema diaphanum* V., p. 199. Basal view; ×8 diameters.

Figure 17.—*Cyclostrema Dalli* V., p. 255. Basal view of a peculiarly sculptured specimen (var. *ornatum*) from station 2115; ×8 diameters.

Figure 18.—*Scaphander nobilis* V., p. 209. Front view of a medium sized specimen; natural size.

Figure 18*a*.—The same. View of a portion of the surface to show the character of the punctations; much enlarged.

Figure 18*b*.—The same. Dentition; ×8 diameters.

Figure 18*c*.—The same. Side view of two of the teeth; ×22 diameters.

Figure 18*d*.—The same. Gizzard, side view; ×2 diameters.

Figure 19.—*Fissurisepta eritmeta* V., p. 204. Side view of the type-specimen; ×8 diameters.

Figure 19*a*.—The same. Posterior view of the apex; ×22 diameters.

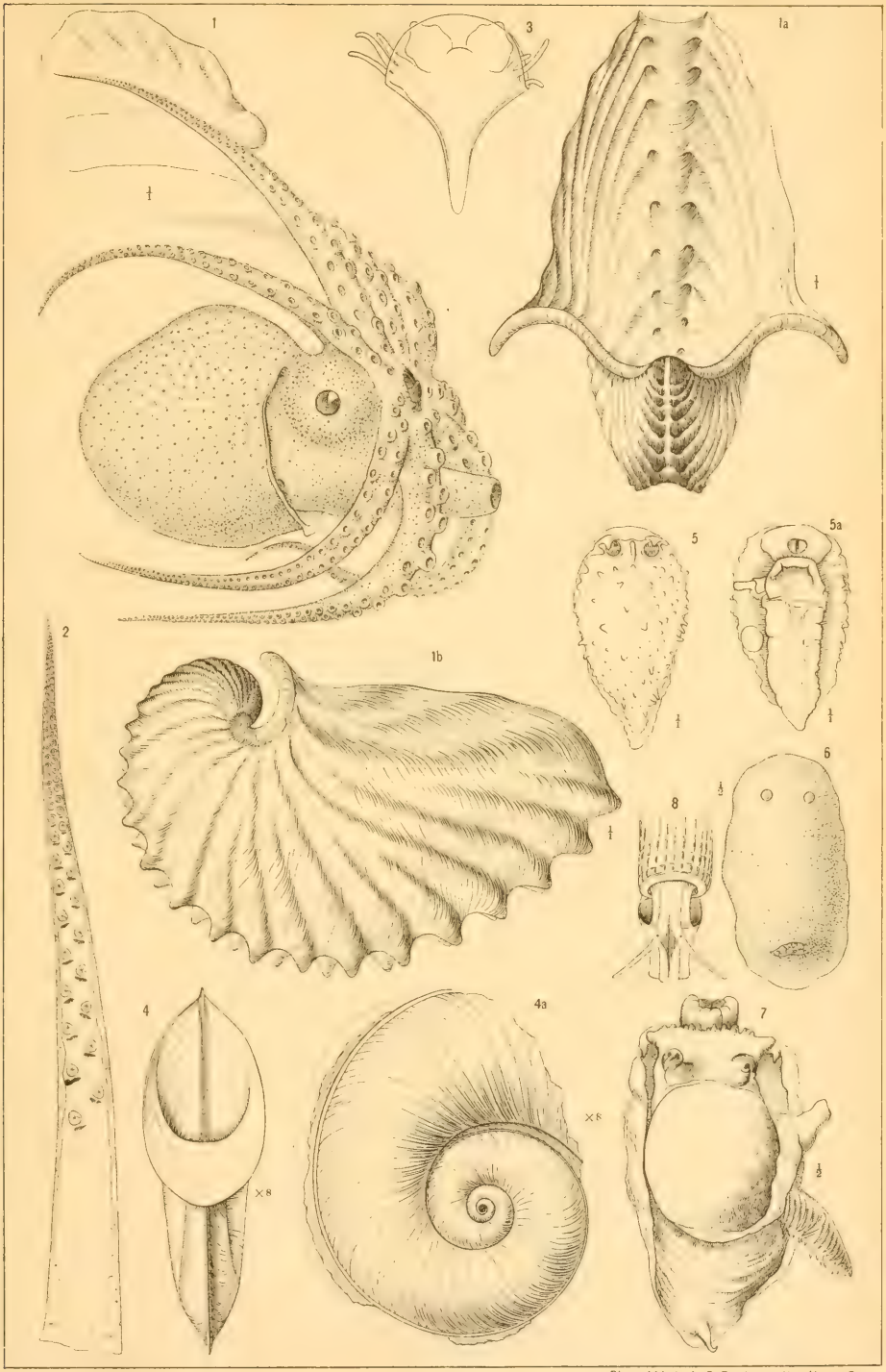
Figure 20.—*Cocculina leptalea* V., p. 202. Side view of the largest specimen with the apex eroded; ×12 diameters.

Figure 20*a*.—The same. Basal view of the shell containing the animal preserved in alcohol; ×6 diameters.

Figure 20*b*.—The same. Side view of a much younger specimen with the apex perfect; ×12 diameters.

Figure 21.—*Poromya sublevis* V., p. 221. Interior of the right valve; ×2 diameters.

Figure 22.—*Thracia nitida* V., p. 221; natural size.



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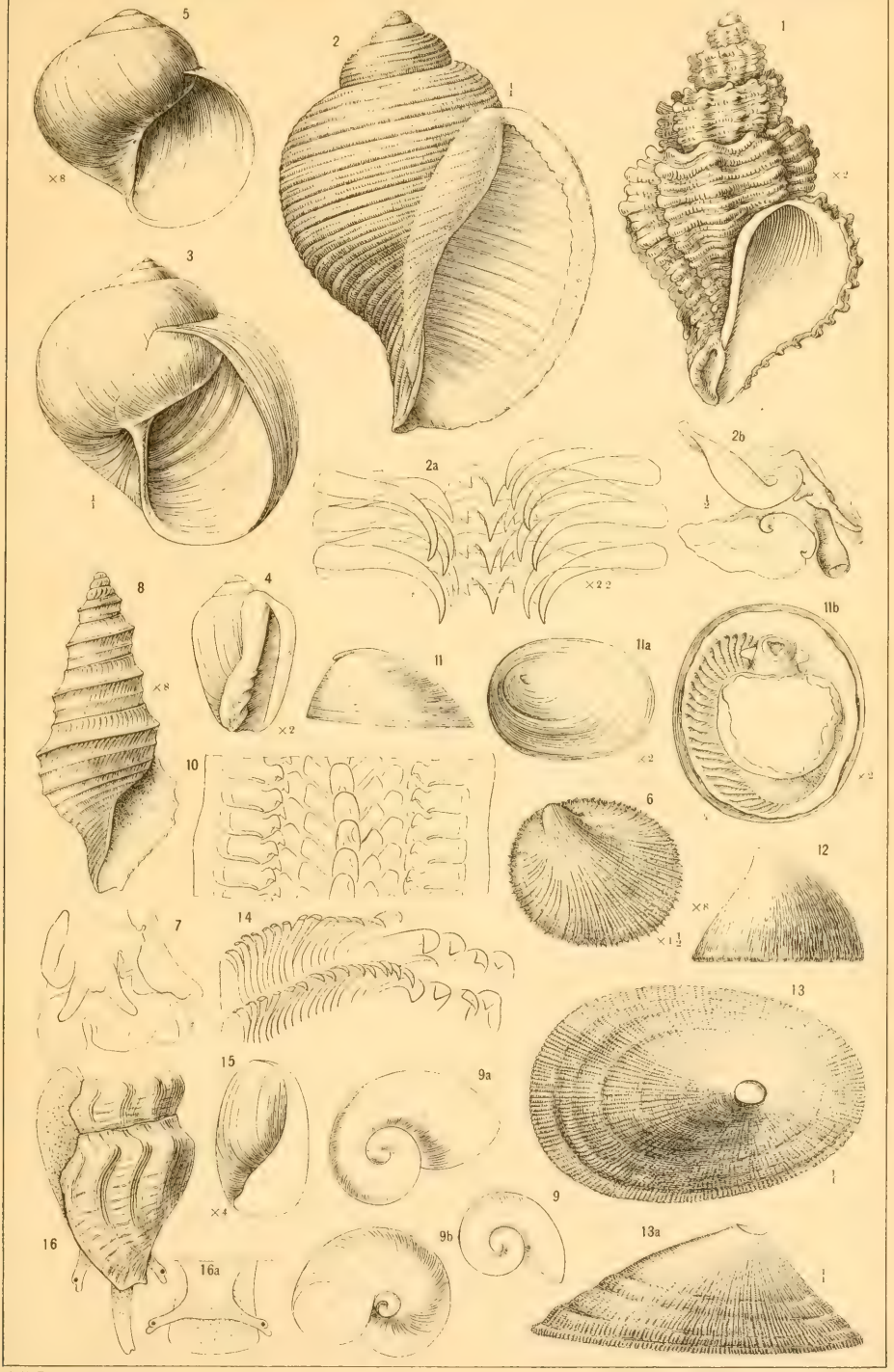
NEW ENGLAND MOLLUSCA.



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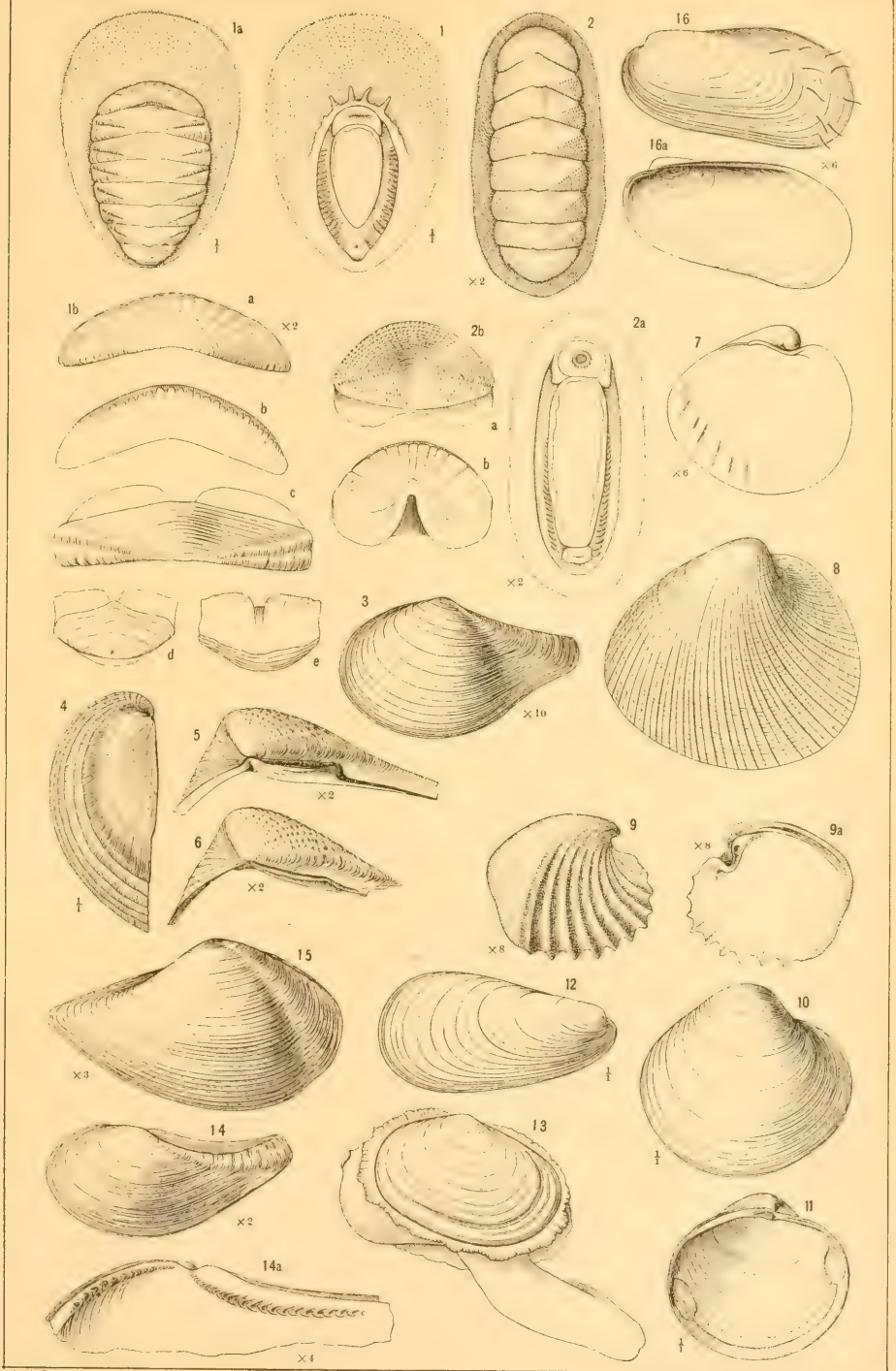

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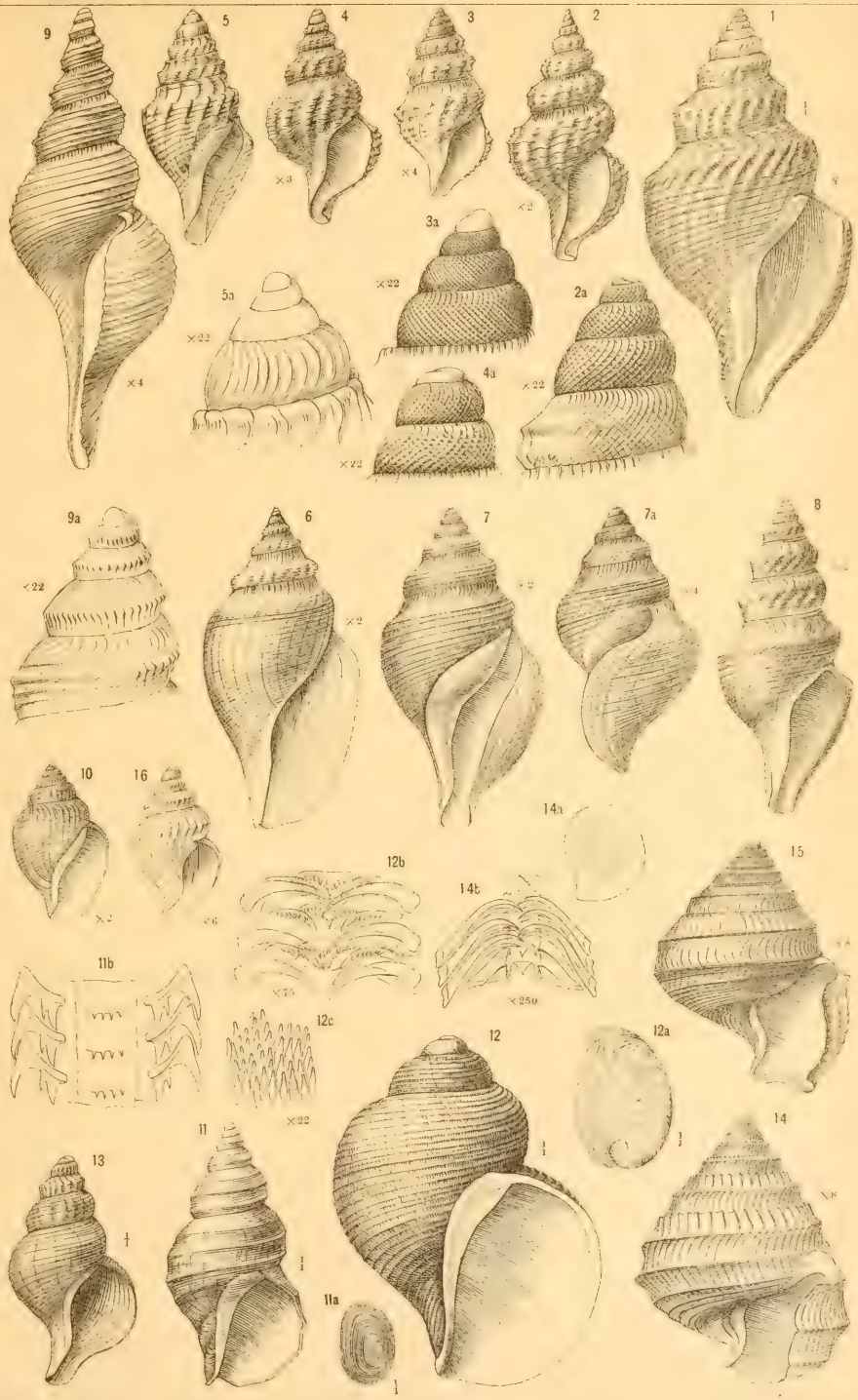

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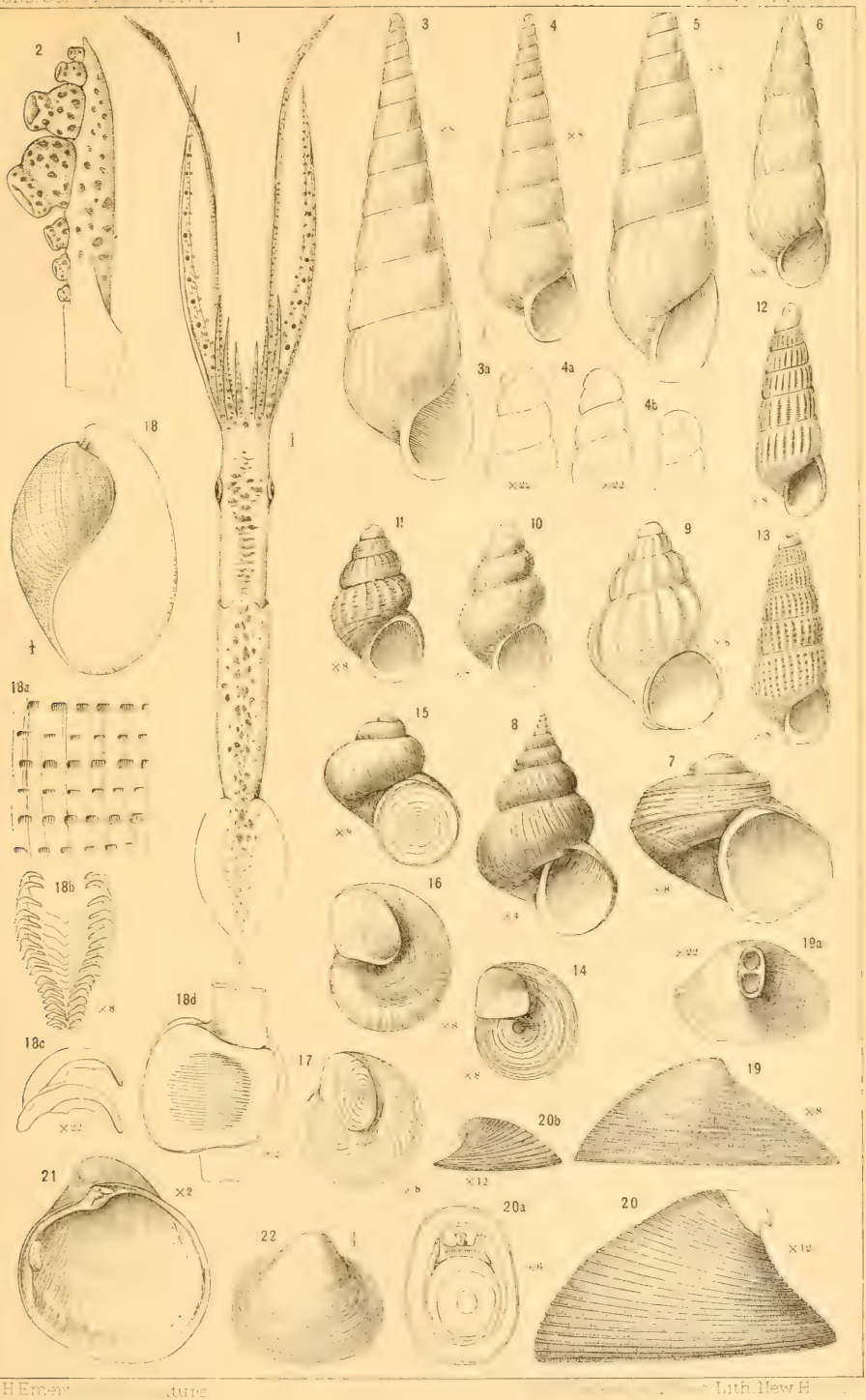

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